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JULY 1986
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VOLUME 4
NUMBER 7

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Renegotiate Your Home Mortgage

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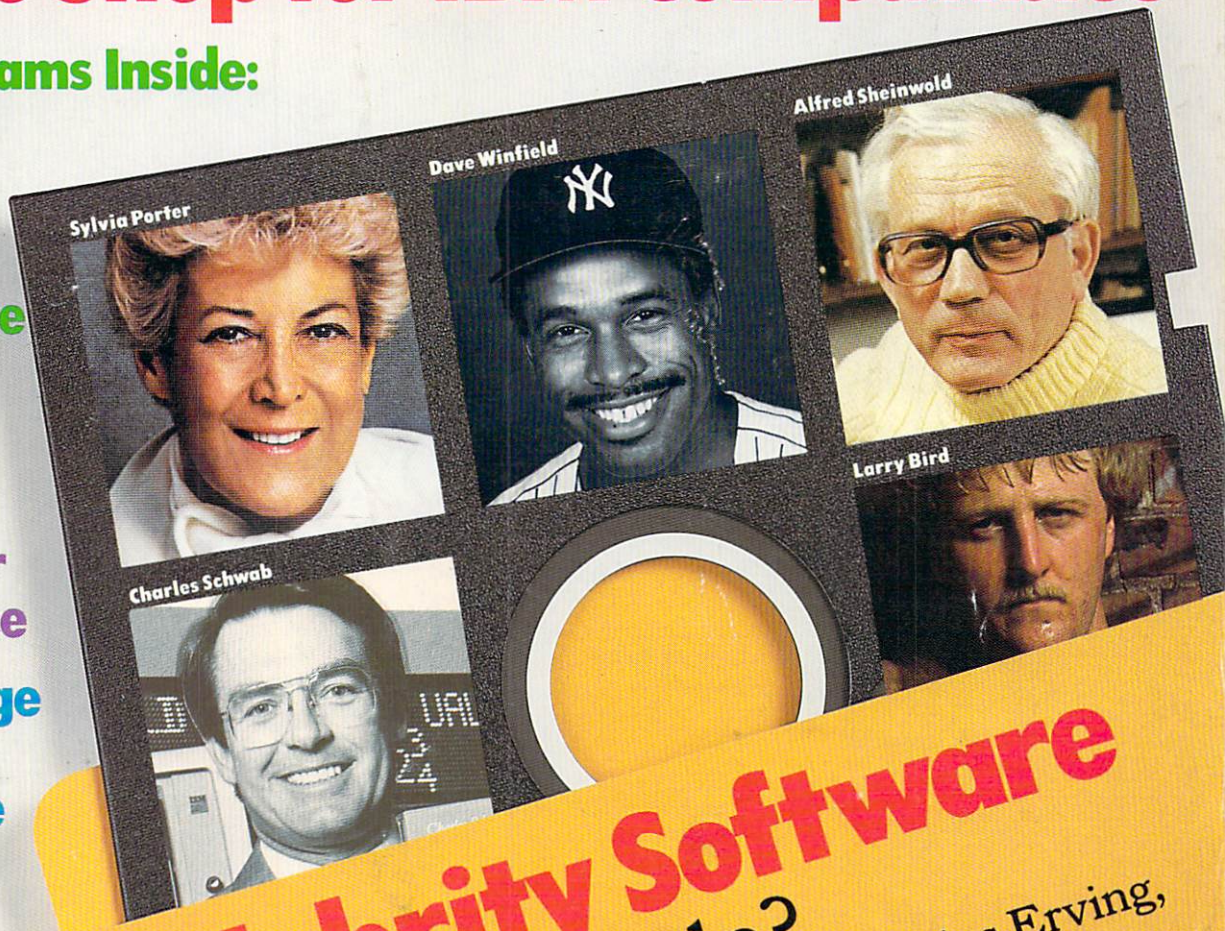

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AT-A-GLANCE
SOFTWARE REVIEWS

ORIGINAL PROGRAMS
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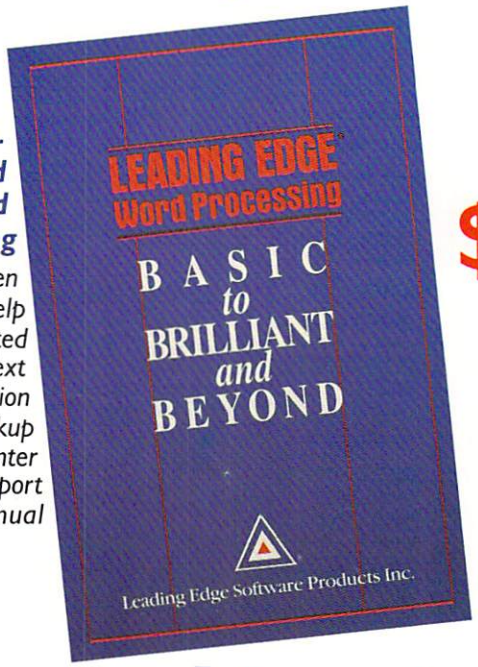

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JULY
1986

FAMILY COMPUTING

VOLUME 4
NUMBER 7

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Do low interest rates mean it's time to re-finance your mortgage? Your computer can answer in a flash.
PLUS: MORTGAGE RENEGOTIATION ANALYSIS PROGRAM

COVER PHOTO BY DOUGLAS MULAIRE

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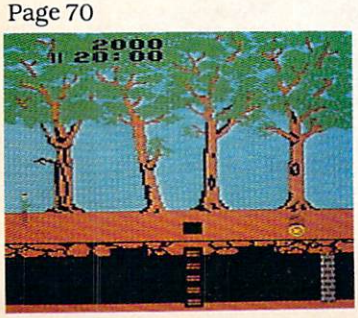

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EDITOR'S NOTE
AN ISSUE FULL OF SURPRISES

You must be used to change—and fast change at that. It's inevitable if you're involved with computers. In just the past few years, we've roller-coastered with the popularity of various computers; we've seen the proliferation of IBM compatibles at prices many families can afford; and, most recently, large numbers of computer users have begun experimenting, successfully, with more extensive applications than ever imagined.

In this atmosphere of flux, just sitting still won't do. Now that the industry's on a pretty even keel, it's time to take stock and make adjustments where called for. So, all you long-time, frequent, or regular readers of FAMILY COMPUTING take notice—you'll find this issue full of the unexpected. Here's what to look for:

First, if you opened to the table of contents, you've already seen a new format that categorizes our articles by application and that should be easier for you to use.

Second, you'll notice that some of our regular departments have new names, or are new altogether:

"Entertainment" is now the title of our former "Games" column, since we felt it was time to reflect the latest developments in entertainment software, which is now much broader than games per se.

"Personal Finance," new to this issue, reflects the interest you've shown every time we've covered the topic. It was time to make it a regular part of the magazine. This issue, author Kimball Beasley's original program and tips (page 14) will help you figure out whether you should refinance your mortgage to take advantage of lower interest rates.

"Home Office" is another new department that originated with you, our readers. So many industry experts said more of us wouldn't be working at home. We are. They said we wouldn't take our work home from the office. We do. And they claimed we'd never use a computer at home for "serious" purposes. We're doing that, too. This new department will address the needs of the growing number of people using computers at home for various work or business purposes. In this first installment of the department, contributing editor Chuck Gageway provides guidelines for setting up a home office.

Third, if you regularly follow our programs and turn automatically to the Programmer section of FAMILY COMPUTING, you're in for a surprise. For this issue, programs are integrated into several articles, so there is no Programmer as you know it. Instead, you'll find a program-related questionnaire (page 49) that will help us bring you more of the programs you enjoy most. And, in addition to the mortgage program mentioned above and the Microtones programs in the K-POWER section, as always, don't miss the special Statue of Liberty programs (page 46). We hope you'll enjoy both the graphics program of the Statue and the computer version of "The Star Spangled Banner."

This issue has a lot more fireworks in it. For example, don't miss our feature article on celebrity software (page 23), our cover story, or the one on how to shop for an IBM compatible (page 32). To make sure you don't miss anything, test out our new Contents Page as a start!

Claudia Cohl

CLAUDIA COHL
EDITOR-IN-CHIEF

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CIRCLE READER SERVICE 38

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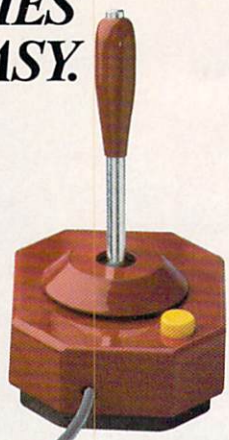
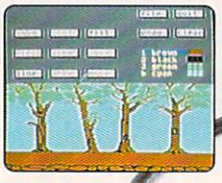
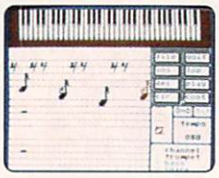


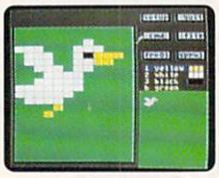


SceneMaker: Design the set. Select from preprogrammed backgrounds like space, jungle or river scenes or create a world of your own.



MusicMaker: Compose the score. Set the mood with just the right music or create triumphant interludes.

SoundMaker: What do you get when you cross a "clunk!" with a "boom?" From explosions to train whistles—smash, blast and whoosh your way into a smorgasbord of sound effects.



SpriteMaker: Who's who and what's what. Create and animate the characters and objects that move across the screen.

The Editor: The grand finale. Look at all the components, choose some and edit others, polish it and . . . bring it to life. We've even given you a blank disk so you can send it to a friend . . . or publisher.

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CIRCLE READER SERVICE 2

LETTERS

ELECTRONIC FAN MAIL

I just had to write to tell you that your *Maze Creator* program was a big hit at my house. I am an Apple IIe and am in constant use by each member of my adopted family. Dad uses me to keep track of all the family finances and Mother and Brother are forever using the word processor. Sister has grown up around my keyboard and is beginning to type in your neat beginner programs. Mom took the time to type in the *Maze Creator* and everyone has a ball with it! So I want to thank you for keeping the "family" in mind as you print your magazine. (I'll let Mom sign my hard copy.)

KATHARINE KOHUDIC
Sumerduck, Virginia

WESTLAW ON-LINE

I was pleased to see WESTLAW included in a recent article in your magazine dealing with on-line databases (*February 1986, page 14*). However, the reference to WESTLAW access via EasyNet is not correct.

WESTLAW does have gateway arrangements with several other on-line services, but not with EasyNet.

DOROTHY M. MOLSTAD
PUBLIC RELATIONS DIRECTOR
West Publishing Company
St. Paul, Minnesota

A QUESTION OF COMPATIBILITY

I'm writing to you in response to your listing of "Leading IBM PC and XT-compatible Computers" which appeared on page 26 of the March 1986 issue of FAMILY COMPUTING. In that listing, you rated the Epson Equity as "mostly" compatible with the

---

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IBM PC. In fact, the Epson Equity I is considered highly compatible.

The Equity I has a high level of hardware and software compatibility with the IBM PC. Virtually all the option boards and software programs that run on the IBM PC will also work on the Equity I. All of the major software packages that we have tested will run on the Equity I without modification, including the standard test of PC compatibility, Microsoft *Flight Simulator* and Lotus *1-2-3*.

PETER BERGMAN
GROUP PRODUCT MANAGER FOR SYSTEMS
Epson America, Inc.
Torrance, California

The March cover article, "A Buyer's Guide to IBM-compatible Computers," was a great disappointment. If you're trying to do articles like that, you should try to provide a reasonably complete listing, not just a list of a baker's dozen "leading" models.

Such incomplete listings are the reason I long ago quit reading *Consumer Reports*, and why I will continue to read your magazine at the library instead of subscribing.

While I realize that any magazine has space limitations, I also believe that it wouldn't have been too terribly difficult to find room for at least another dozen machines. The ones you listed may be the leaders in terms of sales, but they are not necessarily the best, the most readily available in all areas, nor the best supported; the editorial decision to exclude many other worthy candidates was not a good one.

ALAN COURTRIGHT
Cheney, Washington

Editor's Note: See the "Buyer's Guide to Low-Cost IBM Compatibles" and chart beginning on page 32, plus the hands-on reviews for the Epson Equity (page 36) and Kaypro PC (page 37).

CATALOG COMPUTER SOURCE

On page 32 of the April issue, you listed Triton and Unisource Electronics as sources of hardware and software for the TI-99/4A computer. I am a satisfied Triton customer, but had not heard of Unisource and thank you for the tip. One source you did not mention, which has a

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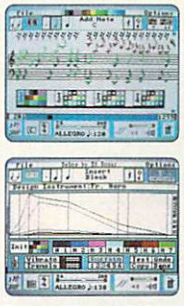

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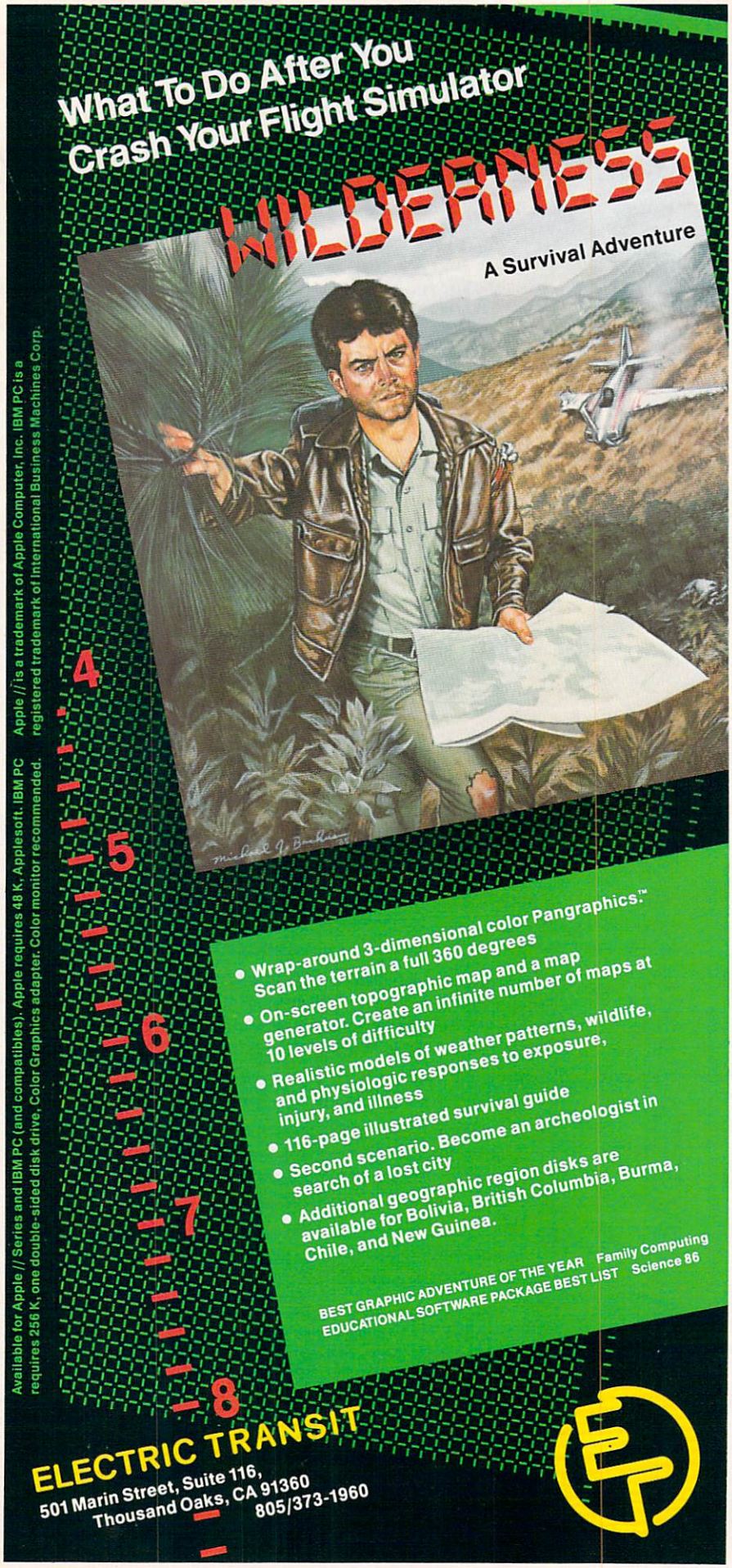

LETTERS

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GREGORY A. JOHNSON
Charlottesville, Virginia

MOOSE JAW GAMEMAKER SEARCH

You recently carried an article about a program called GameMaker that is made by Activision. I was extremely interested in the product and checked all the stores in Moose Jaw for it. They didn't know a thing about it, and they directed me to you.

Could you please send me more information about the program and inform me on how to acquire it. I have an Apple IIc computer.

SCOTT FRANCIS
Moose Jaw, Saskatchewan, Canada

Editor's Note: Your computer software dealer can usually special-order out-of-stock products, or you can try a mail-order source (watch for the article on mail order buying in the August issue of FAMILY COMPUTING*). If you're still stumped trying to find* GameMaker, *write to Activision at 2350 Bayshore Frontage Road, Mountain View, California 94039; (415) 960-0410.*

TI TYPE

I own a TI 99/4A and a Star Micronics SG-10 printer. In "Buyer's Guide to Printers Under $600," (*May 1986*) you stated that the Star Micronics SG-10 did not print italics. The Star Micronics SG-10, SG-15, SD-10, and SD-15 not only print italics, but print many other type styles as well.

LOUIS MORRIS
Jackson, New Jersey

CORRECTION

The correct telephone number for Spectrum Projects, listed in the chart on page 32 of the March issue, is (718) 441-2807. An incorrect area code was printed.

CIRCLE READER SERVICE 16

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CAT'S EYE	7583002
THE DEAD ZONE	2077042
THE FLAMINGO KID	7135032
ORDINARY PEOPLE	2039012
COMPROMISING POSITIONS	4171052
LAWRENCE OF ARABIA	1514072
PRIZZI'S HONOR	4802022
NOTORIOUS	0567132
KISS OF THE SPIDERWOMAN	3187092
THE EMERALD FOREST	3145002
THE BRIDGE ON THE RIVER KWAI	1606062
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PLACES IN THE HEART	0978082
ROMANCING THE STONE	0894092

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PINOCCHIO	5361102
AGAINST ALL ODDS	1633032
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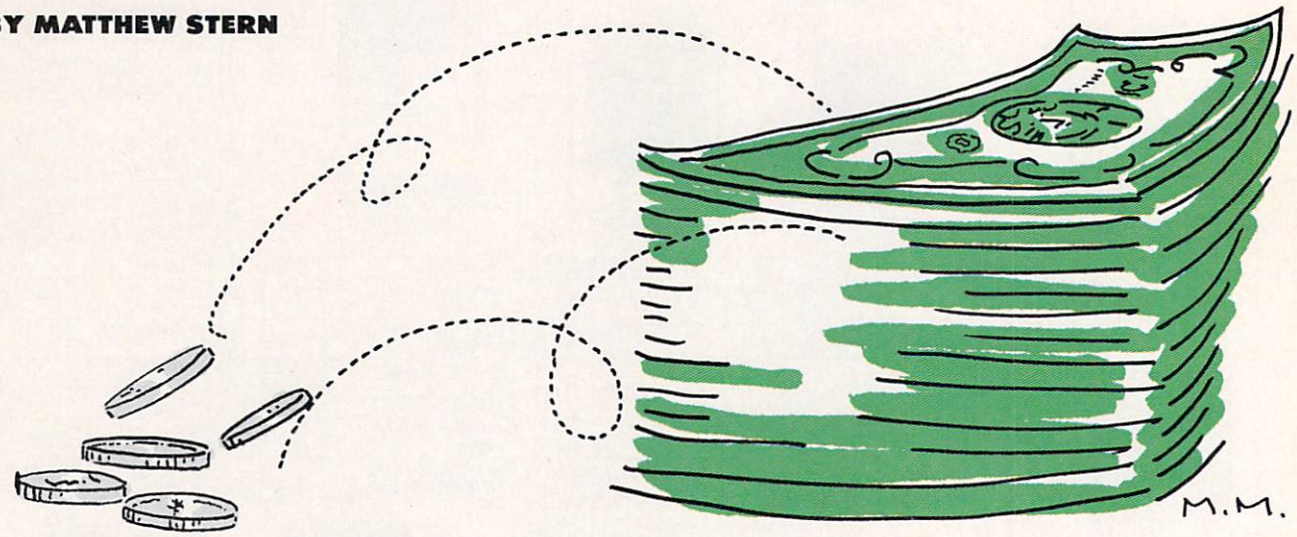
HOME-SCHOOL CONNECTION

GIVE YOUR KIDS A SIMPLE LESSON IN SPREADSHEETS . . . So They Can Watch Small Change Turn to Big Bucks

BY MATTHEW STERN



Electronic spreadsheets have been given a bum rap. Everyone raves about the power of spreadsheet software—but only as business tools for the likes of an accountant, investment analyst, or small-business owner. As many of you know, spreadsheets aren't just for the business savvy who manage large sums of money. In fact, these electronic number-crunching wonders aren't just for adults. Computing kids can also use spreadsheets to do their own money tracking, calculations, and projections—even if they only toy with small change. And if they keep track of their money, maybe they'll figure out how to save some.

But the enticement of a spreadsheet can't compare to that of a good adventure game. Your children will probably need your help in luring them into the practical, yet fun, world of spreadsheets.

So when you've had enough sun, call for the kids, wash the suntan lotion off of your hands, and gather 'round your computer. With this simple hands-on lesson, you can show your children that using spreadsheet software can help them save for new bicycles, tickets to rock concerts, clothes, and if they're thinking ahead, extra money for college. And if *you* don't know much about spreadsheets, this hands-on experience will be a great lesson for you, too.

MATTHEW STERN's *Home/Money Management column on last-minute tax tips appeared in the April issue of* FAMILY COMPUTING.

A LESSON IN MONEY . . .

But before you and your children delve into the workings of a spreadsheet, you'll have to make sure they know basic economic terms such as "income."

"Income? My kids have no income," you may say. Maybe they get allowances. Maybe they have weekend jobs doing lawn work or running a paper route, or maybe they get birthday checks from Aunt Minnie from Pensacola. Wherever it comes from, it's still money they receive. Explain to your kids that, in the working world, this money is called income.

Once they receive the money, no doubt they spend it. They might pay bus fare to go to work, buy lunch at Burger King, or go to the movies or baseball games with their friends. Explain that all of these things are called expenses.

The next term you should mention is net income. Explain that net income is any money left over at the end of the week or month—which means the kids have cash to save. Of course, you should then explain that net loss occurs if they spend more than they receive. (They might have had to borrow from you to make it through the week or month.)

Your kids can use just about any spreadsheet to create budgets. These budgets would list their estimated incomes and expenses for the month and figure out how much they have left. Realistically, most children's incomes and expenses can be tracked just as easily with pencils and paper, but this is a great lesson in both the use of a spreadsheet and in money management.

PLUS A SPREADSHEET DEMO . . .

After you've explained income, expenses, and net income, boot up your spreadsheet. Then show the kids the sample weekly budget (*page 9*) created with a spreadsheet. They'll see that the screen is divided by rows and columns, into boxes called cells. In these cells are text and numbers. Have one of your kids enter this information into the spreadsheet program.

In the first two rows, you'll see a brief description of the worksheet. In column A, all the different categories are listed. The income categories are in rows four through nine. From rows 11 to 18, expenses have been entered. In column B, right next to the categories, is an estimation of how much a child might receive and spend during the week.

Now your children's hands-on lesson begins. Rather than adding up all those numbers by hand, they can enter a formula that does the work for them. To add the numbers in cells B5, B6, B7, and B8, just enter +B5+B6+B7+B8 into cell B9. Include

ILLUSTRATION BY MONA MARK

	A	B
1	Weekly Budget	
2	July 6, 1986	
3		
4	INCOME	
5	Allowance	20.00
6	Work	30.00
7	Gifts	
8	Other	
9	TOTAL INCOME	
10		
11	EXPENSES	
12	Food	10.00
13	Bus Fare	7.00
14	Supplies	7.00
15	Clothes	
16	Entertainment	12.50
17	Other	
18	TOTAL EXPENSES	
19		
20	NET INCOME/LOSS	

cells B7 and B8, even though they are empty, in case your children want to add numbers there later. The spreadsheet will display the answer: $50.00. (Please note that formulas aren't entered into all spreadsheets the same way. If they don't get the correct answer, please check the instruction manual for the proper way to enter formulas.)

Next, show them how to get a total for the expenses. Rather than adding up all those numbers, most spreadsheets have a function (I call it SUM), which calculates the total of the cells selected. To use a function like SUM, your kids have to enter the formula differently than if they were just adding a few numbers. Most spreadsheets will ask them to begin a formula with a special character, like an @ sign, to show that they're not entering another number or title. They type the function, in this case SUM, then enter the cells they want to calculate surrounded by parentheses. Here's the formula they should enter into cell B18:

```
@SUM(B12:B17)
```

Your kids should get the answer: $36.50.

Finally, show them how to find net income. They must subtract the expense total in cell B18 from total income in cell B9. Have them enter this formula into cell B20:

```
+B9-B18
```

The right answer should be: $13.50. Explain that if they stick to this budget, this is how much they will have left at the end of the week.

Then demonstrate how shaving some expenses can really add up. For instance, suppose they decide to spend only $8.95 on entertainment instead of $12.50. Have them move the cursor to cell B16 and type in $8.95. All of the spreadsheet's totals change. What if they want to buy a new pair of shoes? If the total amount in cell B15 for clothes is entered, they'll see how that purchase affects the totals. With the correct formulas put into the spreadsheet, your kids can enter different numbers and get different results, without adding all those numbers again.

. . . EQUALS SAVINGS FOR A RAINY DAY

Then show your children that, if they put away the same amount each month for several months, they will eventually be able to afford something major, like a bicycle. How long and how much would they need to save?

Let's say that the bike costs $175.00, tax included, and they are able to put away $35.00 each month toward it. Have your kids set up a section of the spreadsheet like this:

	A	B
30	GOAL	175.00
31	AMT SAVED/MO	35.00
32	MONTHS TO REACH	

To find out how many months they need to save, they should divide their goal amount by the amount they can save each month. The goal amount is in cell B30 and the amount saved each month is in cell B31. In cell B32, they must enter this formula:

```
+B30/B31
```

According to the spreadsheet, they'll need to deposit $35 each month for five months to have enough for a bike. If they start saving now, they'll be able to get a bike by Christmas.

You should also make sure that your children know that they can put any amount of money into a savings account at a bank, where it will earn interest. Explain that at the end of five months, not only will they have enough money for a bike, but they'll also have a little pocket money.

Banks use a very complicated formula for figuring out interest, but, as you may know, many spreadsheets have a simple function that will figure how much interest money acquires over time. It's called Future Value of an Annuity or FVA (some spreadsheets use FV). FVA will tell your children how much they would have in their savings accounts after a given period of time, depending on the interest rate. Let's say that the local bank gives a monthly interest rate of 0.44%, and they deposit $35 each month for 12 months. Have them set up the spreadsheet like this:

	A	B
1	Amt. to save per month	35.00
2	Interest rate (monthly)	0.0044
3	Number of months	12
4		
5	Account Balance	

Then they should enter the formula shown below into cell B5. (Check your spreadsheet manual for the correct way to enter the formula):

```
@FVA(B1,B2,B3)
```

This tells your kids how much they would have in a savings account if they deposited the amount in cell B1 each month for the number of months in cell B3 into an account that offered the interest rate shown in cell B2. The amount in cell B5 includes the $35 they deposited monthly plus the additional interest.

According to the spreadsheet, they would have $430.26 at the end of the year! Instruct them to change the 12 in cell B3 to 24. They'll see that at the end of two years, they'd have $883.91. Enter 48 for the number of months, and they'd have $1,866.04. So if your kids started saving in their freshman year at high school, look at the extra money they'd have for college.

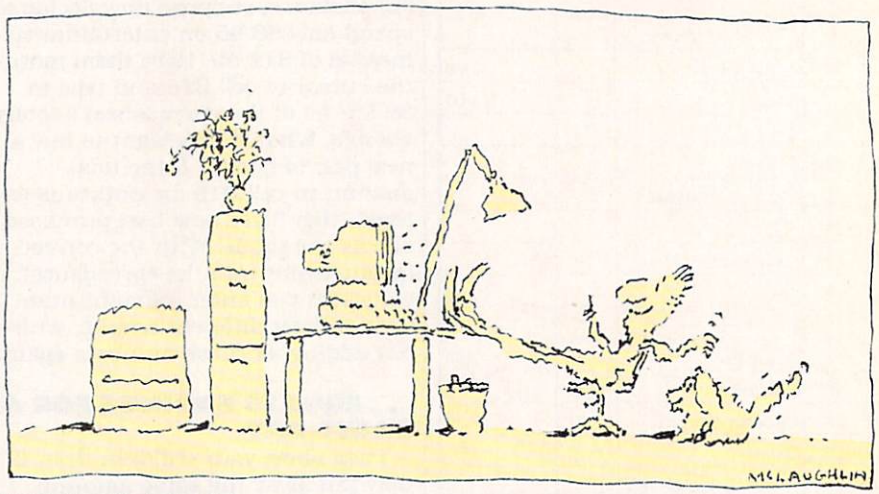
No matter what your kids are saving for, spreadsheet software can help. If they learn how to keep track of their nickels, dimes, and quarters now, they'll be better money managers later—when the money really starts piling in.

FAMILY COMPUTING *would like to thank Mr. Malcolm Purrington and his students at Concord High School in Concord, New Hampshire, for their help in the preparation of this story. The spreadsheets we used for this article were* Crunch (*Paladin Software*), NovaCalc (*Tandy Corporation*), SwiftCalc (*Timeworks*), *and* SynCalc (*Broderbund*).

HOME OFFICE

SET UP A COMFORTABLE WORKSPACE TO INCREASE PRODUCTIVITY

BY CHARLES H. GAJEWAY



One of the most difficult aspects of regularly working with a computer at home has nothing to do with hardware or software. Finding the right place to work, and then furnishing it properly, presents a lot of obstacles to both worker and family. I know, because it took me five years of trial and error before I found a solution to my home office problem.

IDEALLY . . .

Ideally, a home office should be: *large* enough to provide you with enough storage, desk space, and elbow room; *private* enough to avoid distractions and keep clutter out of sight; *convenient* enough that you can easily pop in and take care of a few things; and *comfortable* enough to encourage good work.

In addition, the office should be integrated into your home and family style. This is particularly true if several members of the family share the computer. For instance, I like to encourage my two young children to use the computer. So the office area—while first and foremost a place to do business—has been designed to accommodate everyone's needs. Other factors, such as the number and age of your children (or pets), resistance to distractions, how close you want to be to your family while you work, whether you will receive clients, and the amount of time you spend working at home must be considered when choosing your office area.

A home office puts demands on your pocketbook, especially if you're also purchasing computer equipment to get started. If you live in an apartment or condominium, it may seem impossible to find enough room. Never fear, there's an answer to every problem. I don't live in a mansion, yet my home office houses three computers and four printers, and has 30 feet of shelf space and four file drawers. Besides the desk, which I already had, the setup cost me less than $400.

Contributing editor CHARLES H. GAJEWAY *wrote "Home Work for Professionals," the February 1986 cover story.*

THE RIGHT SPOT

In full-sized houses, the best place for an office will be adjacent to the den or family room. That will make the location convenient for you and your family, yet private enough to shut out distractions. Two other good spots in many homes are a downstairs guest room or a partitioned area in a finished basement. If you don't have such areas available, you may be able to usurp a corner of a less-used area, like a dining room or living room. These make good work areas; the main problem is that your furnishings must be more compact and attractive, and therefore more expensive than would be necessary in a less visible area.

I've found that working in a bedroom area, even an upstairs guest room, presents many problems. The beeps and clatters of an active computer system can keep smaller children awake, you are physically removed from your family when you work, and the comfy atmosphere most people like to create in a bedroom can be disturbed.

If all else fails, a spot in the family room away from the television can work well, especially if you work at home only on occasion. For example, a friend of mine has the family computer set up along one end of a bar in the television room. It's unorthodox, but it looks neat, it's comfortable, and it works for his family.

DESK

Once you've found a spot that suits you, it must be furnished. Most desks, even those labeled "computer furniture," are undersized. They're fine for playing games or writing letters, but decidedly cramped for serious work. The classic office desk is 30″ x 60″, though a variety of sizes are available. Go for the biggest you can fit into your space. On smaller desks, there is no room for spreading out all the materials associated with most work-related projects (answering machine, desk lamp, pencil box, papers, ashtray, for example).

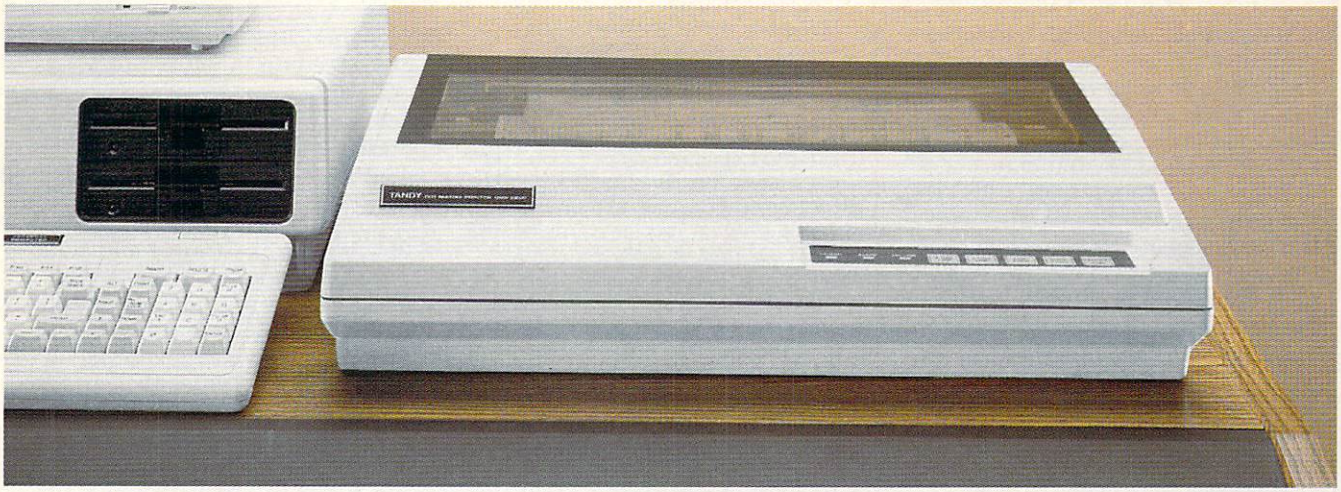
Most experts agree that a plain table without drawers is the best type of work surface for personal computers. (If the desk has drawers, you're always banging your legs into them.) A table allows you to arrange your equipment as you wish and to work freely.

Consider a "budget" computer table from Radio Shack, or a mail-order computer supply vendor such as INMAC. They are inexpensive, yet nicely finished and sturdy. (The larger models are $80-$90, and will hold a personal computer system with room to spare.)

If something more elegant is called for, both INMAC and Yield House have functional furniture items between $200 and $500. If space is at a real premium, consider a mobile system cart. It will pack your equipment into a minimum amount of space, and you can roll it wherever you want. If you have a sensitive hard-disk drive, be sure to "park" the heads before rolling your computer across a room. Alternatively, some wall units are designed to accommodate personal computers, and could be useful if you're trying to fit your office into a small area. →

ILLUSTRATION BY JERRY MCLAUGHLIN

Next to your computer,



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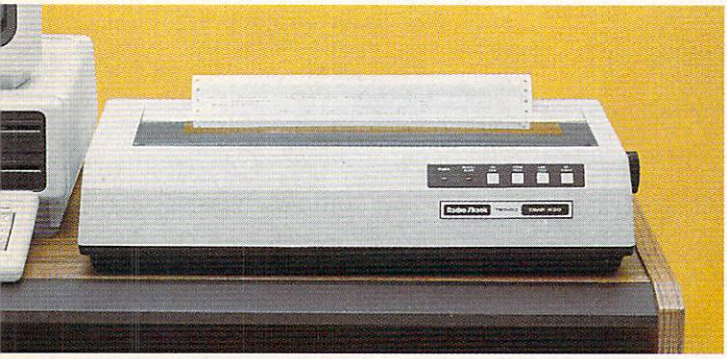

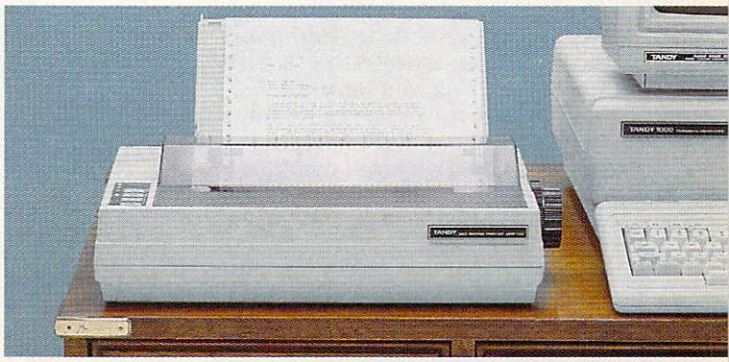

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HOME OFFICE

You can get away with a smaller desk if you have a "workstation" or CRT table for your computer equipment. Such workstation/typing desks are lower, usually 26.5 inches high, compared to 30 inches for a writing desk. Touch typists find this the most comfortable height, with the keyboard about 29 inches above the floor. However, I'm a hunt-and-peck typist and find this too low, as I often have to bend over the keyboard to find the proper key. As a general rule, the most relaxing position is with your elbow bent at a 90° angle or less.

LIGHTING

Lighting and seating are very important concerns. Working in an area that is properly equipped is enjoyable, but trying to "make-do" is torture. Headaches, back problems, and other nagging aches and pains can result from trying to work with improper seating and lighting. A small investment in the right lamps and chair will pay itself back in increased productivity and comfort.

Ideally, you should have two light sources in your home office—one a diffused room light and the other a direct light on your work area. Bulbs in both lights should be 60 or 75 watts. While any sort of overhead light or floor lamp should take care of your background lighting, the best lighting for computer work is a downward beam on the monitor at a 45-degree angle. At this angle, any reflection bounces down into the desk, and not into your eyes. Clamp-on architect lamps that can be bent and rotated to a number of positions are perfect for this use. They are inexpensive, attractive, and can be easily adjusted to provide clear, glare-free light on the keyboard and work area.

SEATING

You may sit in a leather executive's chair at the office, or envision yourself doing so at home (in your castle). Go ahead! But, to work effectively in front of a computer screen, you need to be firmly supported in an upright position. Your eyes should be in line with the top of the monitor so that they look down at the screen from an angle.

Several "catalog-showroom" stores, such as Service Merchandise ([800] 251-1212), have a typing chair priced at around $40. It's not the most elegant or sturdy chair, but it gets the job done. As with all lower-priced chairs, this one offers few adjustments and has just a four-pronged footstand.

Also, the Danish-style "kneeling chair" is quite comfortable, and now comes with rollers and a seat that swivels.

Higher-priced "ergonomic" chairs are priced up to $400, but for $175 you can get a very comfortable long-lasting chair, equipped with larger seats, five-pronged stands, and more adjustments. You can move the seat up and down; you can move the chair-back up and down; you can tilt the chair-back forward and backward. In addition, these chairs are likely to have a kind of hydraulic suspension, so that you bounce slightly as you settle into the chair. This feature provides real comfort.

Finally, you can usually add arms to these typing chairs, but this accessory probably isn't needed unless you spend untold hours in a chair. The arms will restrict your lateral "swivel" movement, just as drawers in a desk affect the amount of leg space you have. Consider these ergonomic chairs if you do a lot of work at home, and your back will thank you.

STORAGE

You'll also need storage—shelves for books, manuals, disk boxes, and supplies; and drawers for files, reports, and printouts. Modular wall shelving is made of tracks you attach to the wall, brackets, and plain wood shelves, and it's an efficient option. You can change the height of shelves at any time by moving the brackets up or down a notch. Modular shelving is inexpensive and easy to install. For about $75, you can make the equivalent of a $500 wooden bookcase.

For drawers, I've found two-drawer letter-sized steel file cabinets to be unobtrusive, inexpensive, and roomy. They cost about $40 each. Stacking plastic file drawers provides the same advantages, plus the ability to expand compactly by adding drawers as needed. Wooden file cabinets are undeniably pretty, but very costly (from $125 to $250 for a two-drawer set). If they are a must, Yield House has several reasonably priced models (some in kit form).

BETTER THAN EXPENSIVE SOFTWARE

A good office encourages the productive use of your computer for work, education, and entertainment. When equipment and software is convenient, family members will use it more frequently. And that increases the value of your investment tremendously, perhaps even more than an expensive integrated software package. I know it has for me. FC

SHOPPING TIPS

The $400 I spent on office furnishings breaks down like this: $230 for a CRT table and printer stand; $75 on modular shelving; $80 on two file cabinets; and $30 on a couple of architect lamps. I could easily have spent a lot more. Here's a guide to setting up your office without busting your budget—or making expensive mistakes.

1. Start small, and experiment with the best place and arrangement for your system. Use a card table and a folding chair until you're sure you've found the right spot. An architect lamp will provide a good light source, and a pillow on the folding chair will raise you to about the right height.

2. Buy your worktable first, since you're probably sick of looking at the card table. Next, get a chair. Then add shelves, and finish off with file cabinets, accessories, and additional lighting as needed. Don't buy something unless you need it. If you do need something, buy more than you think you'll need, or buy something modular that can expand easily; I filled 30 feet of bookshelves in two months!

3. Shop hard. Start by ordering some mail order catalogs to get a feel for what's available. Don't forget either Radio Shack or your local unfinished furniture store. Wait for sales, and hunt odd-lot outlets for shelving, file cabinets, lamps, etc. I saved $12 each on my file cabinets and $5 each on my lights by simply shopping carefully. Stay away from office-supply and computer stores; you can usually find the same items elsewhere for far less money.

4. Look for gadgets like keyboard drawers and spring-arm copystands that can make small spaces act like bigger ones. Avoid vinyl-on-flakeboard furniture products; they warp and loosen under hard usage and are often poorly designed.

5. Install a phone outlet in your office. In fact, install a separate phone line with its own number, especially if you do any telecommunications. A second phone number is a true convenience, and the incremental cost is very low.

CATALOGS/RETAILERS

INMAC, (408) 727-1970; **Pryor, Inc.**, (414) 351-6226; **Yield House**, (603) 356-3141; **Global Computer Supplies**, (516) 420-0044.

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- Get your message across and back again with ***GE Mail™***, GEnie's electronic mail service.
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INFORMATION SERVICES

General Electric Information Services Company, U.S.A.

CIRCLE READER SERVICE 48

PERSONAL FINANCE

A Program to Help You Decide Whether to Trade in Your Mortgage For One With Better Terms

BY KIMBALL J. BEASLEY

These days, with mortgage interest rates dipping as low as 9 or 10 percent, it seems silly to stay locked into an old mortgage and go on paying more. Wary of losing your business, most lenders will let you renegotiate ("roll over") your old mortgage for a new one with more favorable terms, but doing so is never free of cost. Prepayment penalties may sometimes be charged for winding up the old mortgage ahead of term. Costs associated with the renegotiation—lawyers' and accountants' fees plus "points" (i.e., a percentage) of the new mortgage balance—will be incurred as well. Reduced tax benefits, due to lower interest payments, must also be anticipated.

With all these factors to consider, comparing mortgage renegotiation options in detail may be too time-consuming for mere paper and pencil. But the program listed below, *Mortgage Renegotiation Analysis*, will perform the number-crunching in a flash!

HOW THE PROGRAM WORKS

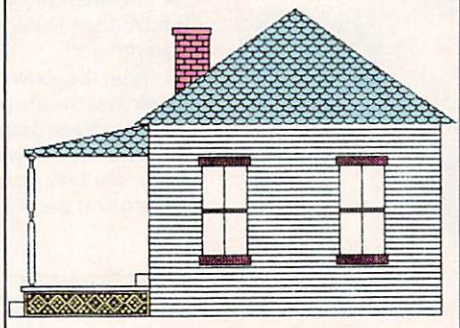
No short program can take into account all possible variations of mortgage terms and anticipate the effect of changing financial circumstances on a mortgage picture. To simplify its calculations, *Mortgage Renegotiation Analysis* makes several assumptions about the overall financial context and about the mortgages under examination. Knowing where these assumptions lie can help you use the program more effectively in comparing real mortgage options.

In the first section, you're asked to enter your current tax bracket. This percentage will be used to estimate the dollar value of tax benefits through the life of your current mortgage and through that of the renegotiated mortgage. The program assumes that neither circumstance, nor the declining interest portion (i.e., the deductible portion) of mortgage payments over time will substantially change your tax bracket from what it is today.

KIMBALL J. BEASLEY *is a senior engineer at a consulting firm in Princeton, N.J. He wrote the July 1985 Home/Money Management column, "Financial Decision-Making."*

You're then asked to enter your current, prevailing rate of interest for personal investment. This value will be used in calculating the "present cost" of each mortgage option and the "present value" of tax benefits that will accrue to it.

"Present cost" and "present value" figures express the value of money paid out over time in terms of money in hand today. For example, if your monthly mortgage payment were $100, you could invest a certain amount of money today that would be sufficient, along with the interest it generated, to meet next



month's payment. A somewhat smaller amount would be sufficient, after accruing two months' interest, to meet the following payment.

Added together, the sums required for investment to meet *all* mortgage payments as they occurred would be that mortgage's "present cost." In similar fashion, the dollar values of tax benefits accruing to each payment of a mortgage can be discounted to their present values and added together to determine the present value of tax benefits for the mortgage as a whole. The higher the "present cost," in a sense, the more expensive a mortgage option is in the long run. Next, you're asked if this mortgage is on your principal place of residence. If it is, "points" (a percentage of a mortgage balance charged up-front for renegotiation) can be deducted in the first year after renegotiation. If not, these "points" must be deducted in even portions through the mortgage term.

Then, you're asked for basic facts about your current mortgage: its original amount, interest rate, term in months, present age in months, as well as the amount or percentage of any prepayment penalties you will incur if you terminate the mortgage ahead of schedule. A fixed-rate mortgage is assumed. *Mortgage Renegotiation Analysis* is not a suitable tool for attacking the problem of adjustable-rate mortgages (ARM's).

You're then asked to supply information about the new mortgage: its interest rate (again, a fixed-rate mortgage is assumed), term, the "points" (percentage of balance) that will be demanded for renegotiation, the sum of any non-deductible flat fees (lawyer's fees, for example), and the sum of any deductible fees.

The program then performs its analysis. Your current monthly payment and balance are determined from the original amount, term, and age of your present mortgage. The program assumes your mortgage is being paid off in even, monthly installments throughout the entire term—i.e., that no special arrangements were made to postpone portions of liability or pay off portions up-front. The new mortgage amount is assumed to equal the present mortgage balance. Exit fees and points are handled as a one-time expense, not "rolled over" to become part of this amount. Your new monthly payment is determined according to the same assumption of regular payments.

The program then looks ahead into the future, and computes the amount of interest you will pay over the next twelve months on both your present mortgage and the proposed new mortgage. Multiplying these figures by your tax bracket, the program determines the dollar value of tax benefits from interest over the coming year in both cases. The first-year tax benefit for up-front costs (points and fees) of renegotiation is also computed as is the total of up-front costs.

Finally, the program determines the number of months required after renegotiation to recover up-front costs after deductions—the break-even point. A common "rule of thumb" states that if break-even occurs less than three years after renegotiation, a new mortgage will be financially beneficial in the long run.

CONCLUSION

Different lending institutions offer a variety of mortgage renegotiation terms (e.g., lower closing costs but higher interest rates, shorter or longer mortgage payoff periods, etc.).

MACPAINT ILLUSTRATION BY JOHN JAINSCHIGG

IBM PC & compatibles/*Mortgage Renegotiation Analysis*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 00.05.00 or 01.01.00. It should also work on many other PC compatibles.

```
10 SCREEN 0,0:WIDTH 80:KEY OFF:D$="$$########.##"
20 F$="##########":S$=STRING$(79,"-"):GOSUB 1000:PRINT
30 INPUT "What is your marginal tax bracket (%)";TAXBK
40 TAXBK=TAXBK/100:PRINT
50 PRINT "What is the effective annual rate of interes
t"
60 INPUT "(after tax) on your best long-term investmen
t (%)";INR
70 INR=INR/1200:PRINT
80 PRINT "Is this mortgage on your principal residence
? (Y/N)"
90 K$=INPUT$(1)
100 IF K$<>"Y" AND K$<>"y" AND K$<>"N" AND K$<>"n" THE
N 90
110 PRF=(K$="Y" OR K$="y")
120 GOSUB 2000:GOSUB 1000:PRINT
130 PRINT "For your present mortgage ...":PRINT
140 INPUT "What was the original amount ($)";EXAMT
150 PRINT:INPUT "What is the interest rate (%)";EXINR
160 EXINR=EXINR/1200:PRINT
170 INPUT "What was the original term (months)";EXTERM
:PRINT
180 INPUT "How long have you held the mortgage (months
)";EXAGE:PRINT
190 PRINT "What percentage of the remaining balance of
 your"
200 PRINT "mortgage will you have to pay in penalties
if you"
210 INPUT "renegotiate at this time (%)";EXEXP
220 EXEXP=EXEXP/100:PRINT
230 PRINT "How much will you have to pay in flat penal
ty"
240 INPUT "fees if you renegotiate at this time ($)";E
XEXF
250 GOSUB 2000
260 GOSUB 1000:PRINT
270 PRINT "For the proposed new mortgage ...":PRINT
280 INPUT "What interest rate is offered (%)";NWINR
290 NWINR=NWINR/1200:PRINT
300 INPUT "What will the term be (months)";NWTERM:PRIN
T
310 PRINT "What percentage of the new balance (how man
y"
320 PRINT "points) will be asked for up front (%)";
330 INPUT NWPTS:NWPTS=NWPTS/100:PRINT
340 INPUT "What will deductible flat fees amount to ($
)";NWDFS:PRINT
350 INPUT "What will non-deductible flat fees amount t
o ($)";NWNFS
360 GOSUB 2000:CLS:LOCATE 12,35:PRINT "Processing ..."
370 EXMP=EXAMT*(EXINR*(1+EXINR)^EXTERM)/((1+EXINR)^EXT
ERM-1)
380 BAL=EXAMT:FOR I=1 TO EXAGE
390 INPRT=BAL*EXINR:PRPRT=EXMP-INPRT:BAL=BAL-PRPRT
400 NEXT I:NWAMT=BAL
410 EXPC=0:EXPV=0:EXYTB=0:FOR I=1 TO EXTERM-EXAGE
420 INPRT=BAL*EXINR:PRPRT=EXMP-INPRT:BAL=BAL-PRPRT
430 EXPC=EXPC+EXMP/(1+INR)^I
440 EXPV=EXPV+(INPRT*TAXBK)/(1+INR)^I
450 IF I<13 THEN EXYTB=EXYTB+INPRT*TAXBK
460 NEXT I
470 UFCOST=NWDFS+NWNFS+EXEXF+(NWPTS+EXEXP)*NWAMT
480 UFDOT=(NWPTS*NWAMT*-(NOT PRF))/NWTERM
490 UFDED=(NWDFS+EXEXF+EXEXP*NWAMT+(NWPTS*NWAMT*-PRF)+
(UFDOT*12*-(NOT PRF)))*TAXBK:UF=UFCOST-UFDED
500 NWMP=NWAMT*(NWINR*(1+NWINR)^NWTERM)/((1+NWINR)^NWT
ERM-1)
510 BAL=NWAMT:NWPC=0:NWPV=0:NWYTB=0:FOR I=1 TO NWTERM
520 INPRT=BAL*NWINR:PRPRT=NWMP-INPRT:BAL=BAL-PRPRT
530 NWPC=NWPC+NWMP/(1+INR)^I
540 NWPV=NWPV+((INPRT+UFDOT)*TAXBK)/(1+INR)^I
550 IF I<13 THEN NWYTB=NWYTB+INPRT*TAXBK
560 NEXT I
570 EXBAL=NWAMT:NWBAL=NWAMT:FOR I=1 TO NWTERM
580 INPRT=EXBAL*EXINR
590 PRPRT=EXMP-INPRT:EXBAL=EXBAL-PRPRT
600 NINPRT=NWBAL*NWINR
610 NPRPRT=NWMP-NINPRT:NWBAL=NWBAL-NPRPRT
620 UF=UF-((EXMP-INPRT)*TAXBK-(NWMP-NINPRT)*TAXBK)
630 IF UF<=0 THEN BKVN=I:I=NWTERM
640 NEXT I:GOSUB 1000
650 PRINT TAB(56);"Present Mtg.";TAB(71);"New Mtg."
660 PRINT S$
670 PRINT "Monthly payment";TAB(50);USING D$;EXMP;
680 PRINT TAB(65);USING D$;NWMP:PRINT S$
690 PRINT "Months to payoff";TAB(50);USING F$;EXTERM-E
XAGE;
700 PRINT TAB(65);USING F$;NWTERM:PRINT S$
710 PRINT "Tax benefit of interest (next 12 months)";
720 PRINT TAB(50);USING D$;EXYTB;
730 PRINT TAB(65);USING D$;NWYTB:PRINT S$
740 PRINT "Up-front tax benefit for points and fees";T
AB(65);USING D$;UFDED
750 PRINT S$:PRINT "Sum of first year's tax benefits";
760 PRINT TAB(50);USING D$;EXYTB;
770 PRINT TAB(65);USING D$;NWYTB+UFDED:PRINT S$
780 PRINT "Total up-front cost (before deductions)";TA
B(65);USING D$;UFCOST
790 PRINT S$
800 PRINT "Present cost of mortgage";TAB(50);USING D$;
EXPC;
810 PRINT TAB(65);USING D$;NWPC+UFCOST:PRINT S$
820 PRINT "Present value of tax benefits over term";
830 PRINT TAB(50);USING D$;EXPV;
840 PRINT TAB(65);USING D$;NWPV+UFDED:PRINT S$
850 PRINT "Net present cost";TAB(50);USING D$;EXPC-EXP
V;
860 PRINT TAB(65);USING D$;NWPC+UFCOST-NWPV-UFDED
870 PRINT S$
880 IF BKVN<>0 THEN PRINT "Break-even will occur in mo
nth";BKVN:GOTO 900
890 PRINT "Break-even will not occur within term of ne
w mortgage."
900 GOSUB 2000
910 CLS:PRINT "Would you like to ..."
920 PRINT:PRINT "<a>ssess another mortgage option, or"
930 PRINT "<q>uit?"
940 K$=INPUT$(1)
950 IF K$<>"A" AND K$<>"a" AND K$<>"Q" AND K$<>"q" THE
N 940
960 IF K$="A" OR K$="a" THEN 260
970 END
1000 CLS
1010 PRINT TAB(25);"Mortgage Renegotiation Analysis"
1020 PRINT TAB(25);STRING$(31,"-"):RETURN
2000 LOCATE 24,6
2010 PRINT "(Press <SHIFT>-<Prt Sc> to print this page
, or <ENTER> to continue.)";
2020 K$=INPUT$(1)
2030 IF K$<>CHR$(13) THEN 2020 ELSE RETURN
```

Re-running *Mortgage Renegotiation Analysis* for each change of options will help careful mortgage shoppers know when to "play dead," and when to "roll over."

Note: The foregoing article and program are intended to help individuals understand and assess the effects of some, but by no means all the factors that may bear on a decision to renegotiate a mortgage. Accountants differ on some of the points presented herein; in particular, on the validity of using "present value" figures to describe cash-flow situations. Though every effort has been made to ensure the accuracy of the material presented here, its use should not substitute for the services of a qualified financial adviser.

TELECOMPUTING

GET A COLLEGE DEGREE—WITHOUT LEAVING HOME
Use Your Computer and Modem to Access a Professor, a Classroom of Students, and a Campus

BY BERNADETTE GREY

When you're 18 years old and fresh out of high school, going to college often makes perfect sense. Although juggling classes, studying, and holding a part-time job to help pay the bills can create a hectic schedule, at 18, you probably won't have too many other responsibilities.

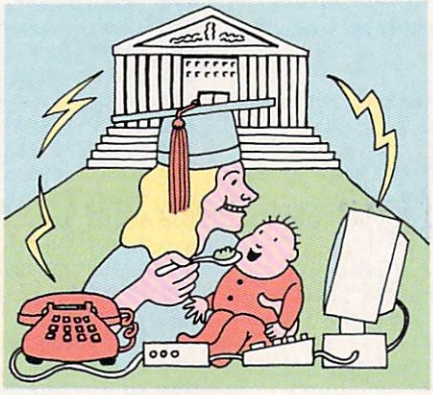
But what if you're not 18? What if you hold a full-time job, have a family to take care of, or haven't been in a classroom in years? All of these circumstances can make going to college tough—if not impossible.

That's all changing. Your computer and a modem can be the doorway to a college degree. College courses that lead to a degree are taught via modem by a number of accredited institutions in the country. These colleges offer everything from accounting courses to creative writing classes to Master of Business Administration (MBA) programs.

DIAL A DEGREE

Thousands of students across the country are using their computers to get instructions and assignments from their professors, turn in their classwork, meet with their teachers, and have discussions with their classmates. In some of the classes, students can conduct "live" interactive conferences, and some let students leave messages around the clock for their professors. Many students never have to set foot on campus, nor do they ever meet their professors or their classmates.

For instance, Lourdes Giovannini of San Francisco is earning an accounting degree through Thomas A. Edison State College in New Jersey; and Joseph Barbuto of Long Island, New York, is working toward a Bachelor of Science in General Studies at the New York Institute of Technology. Students like Giovannini and Barbuto can go to school whenever they have the time, whether it's at midnight, on a Saturday afternoon, or during dinner hour. They can adjust their school schedule to accommodate their professional and personal lives, giving them more time for all three, instead of adjusting their professional and personal lives to accommodate their school schedule. Said Barbuto, 23, who is taking English 1020: "With my computer, I spend more time studying than I did when I was really in the classroom. I also get more help from my teacher now than I did when I was in regular college."



There are many other advantages to this high-tech style of education. Going to college on-line gives students the opportunity to learn at their own pace: some may want to earn a degree in two or three years, while others may take six. It's also ideal for the handicapped or for people who live too far away from a college to commute: on-line college virtually eliminates location barriers. You can take an on-line course at a college in Florida, even if you live in California. For example, out of 400 students currently enrolled in the American Open University of New York Institute of Technology (NYIT), only 55 live in New York State.

RELIEF FOR THE WEARY

Without on-line college programs, Lourdes Giovannini might never have been able to pursue a degree in accounting. The mother of two toddlers and the wife of a full-time Berkeley University student, she also does the accounting for her father-in-law's medical practice and for her family-owned horse ranch. Obviously, Giovannini has very little time on her hands. Yet, because of TeleLearning Systems' Electronic University, an organization that offers accredited college courses from a number of colleges and universities across the country, she's found the time to go to college.

Giovannini is a matriculated student at Thomas A. Edison State College, currently enrolled in Tax Accounting and Principles of Accounting. She figures it will take her about four years to earn her accounting degree and then she plans to take the Certified Public Accounting (CPA) examination. "Because the classes aren't held at a set hour, I can dedicate time to the class whenever I have free time," says Giovannini. "It's perfect for people like me who work, but I think it's also good for other people. My husband, who is a full-time English student at Berkeley, plans to take a class through TeleLearning this summer. And TeleLearning also has tutoring classes for children."

THE FUTURE OF ON-LINE LEARNING

A vote of confidence—and a word of caution—comes from Dr. Barry Centini, director of the doctorate of arts program in Information Science within the Nova University Center for Computer-Based Learning. Centini, who teaches a class called Digital Computers for Information Management, advocates the hands-on approach of telelearning. →

TELELEARNING PAYS OFF

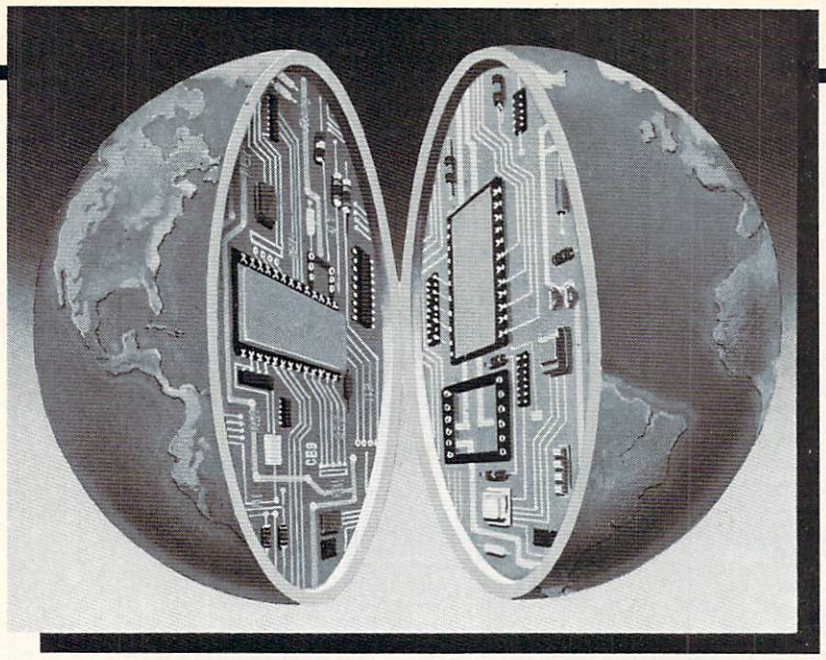
Michael Shea needed only four more classes for a four-year degree that would boost his salary and standing on the Dade County School District police force. But after trying classes at three other colleges over the years, he still hadn't earned the degree he needed.

Then, a syndicated FAMILY COMPUTING column on telelearning that appeared in the *Miami Herald* made him look at his Commodore 64 computer and modem in a new light. He signed up to take the required classes on-line through the New York Institute of Technology, and graduated in January 1986, with a bachelor's degree in General Studies.

"I think that the growth of this type of college is inevitable. We're an electronic society; it's convenient," added Officer Shea.

Bernadette Grey is FAMILY COMPUTING'S *associate editor.*

ILLUSTRATION BY STEVE PARTON



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CIRCLE READER SERVICE 10

"The reason our system is so effective now is that we are teaching telecommunications by telecommunications," he said. Most Nova students are actually working in the field, and much of what they learn in school they immediately apply in the workplace. "I think (this method) can be used by any college."

Before a college starts giving on-line courses, Centini believes, it should supplement with telecommunications what professors are already teaching in class. For example, a data base of students could be set up so they could leave messages for each other and for the professor; then independent course work could be added.

New telelearning programs are being developed at other schools (*See the accompanying "Guide to an Electronic Degree."*) New Jersey Institute of Technology, for example, is experimenting with two courses, Introduction to Computer Science and Computer Center Organization. If successful, the school will expand course offerings. And according to Centini, student interest in on-line programs continues to grow. "Once the students surmount the initial technical problems involved in learning the telecommunications process, they realize, 'THIS is it!' Rather than feeling isolated, the students feel like they belong to something. They are constantly in communication with each other directly or through us. Our student in Key West, Florida can communicate easily with our student in Sitka, Alaska. Telecommunications has taken them from being isolated students and put them into an interactive network." FC

GUIDE TO AN ELECTRONIC DEGREE

Everyone already has the chance to earn a college degree electronically. In the past five years, a number of accredited colleges and universities have begun offering on-line degrees that are available to you, no matter where you live. Write to the school of your choice to find out application procedures and the extent of their on-line offerings.

Here are some that we found:

American Open University of New York Institute of Technology

ADDRESS: Central Islip, New York 11711; (516) 348-3300, (800) 222-6948.

DEGREES OFFERED: Three bachelor's degrees: Business Administration, Behavioral Sciences, General Studies.

NUMBER OF COURSES OFFERED: 110

COSTS: Tuition rate of $75 a credit out-of-state, or $132 in-state (includes use of campus and other student facilities), plus a $25 communications fee per on-line course. The hourly charges from Telenet are picked up by the university.

HARDWARE REQUIREMENTS: Any personal computer and modem.

NUMBER OF STUDENTS ENROLLED: 400

TIME SPENT IN CLASSROOM: None

EXAMINATION: Proctored final examination is given at a college near your home.

Distant Learning Center, City University of Washington

ADDRESS: 16661 Northup Way, Bellevue, Washington 98008; (206) 643-2000, (800) 542-7845 (Washington) (800) 426-5596 (outside of Washington).

DEGREES OFFERED: Bachelor's degrees: Business, Accounting, Health Care, General Studies, Management, Fire Command, and Nursing Administration. Several accelerated BS programs available. Master's degrees: Master of Business Administration, Master of Public Administration, MBA with concentrations available in individual financial planning, information systems, and technology/engineering management, a Master of Public Administration with a concentration in fire administration, combined MBA and MPA, and combined MBA and Health Care.

NUMBER OF COURSES OFFERED: 68

COSTS: City University's regular course fee ($290 per three-credit graduate course, $95 per one-credit graduate course, $365 per five-credit undergraduate course), plus a $25 Telenet access fee for each 11-week period, including three hours of on-line use. Subsequent on-line time is available if needed for an additional charge. Begins in the junior year.

NUMBER OF STUDENTS ENROLLED: 25

TIME SPENT IN CLASSROOM: None

HARDWARE REQUIREMENTS: Any computer and modem.

EXAMINATION: Professors give take-home examinations and all final exams are given at a local library or college.

Electronic University, TeleLearning Systems Inc.

ADDRESS: 505 Beach Street, San Francisco, CA 94133; (415) 928-2800, (800) 445-3276 (in California); (800) 225-3276 (outside California).

DEGREES OFFERED: Two associate degrees: Associate in Arts, Associate in Science of Management; two bachelor's degrees: Bachelor of Arts, Bachelor of Science in Business Administration; three MBA programs.

NUMBER OF COURSES OFFERED: 105

COSTS: One-time fee of $195 for access to the network. Includes operating software and communications software. Charges depend on the college or university administering the course.

HARDWARE REQUIREMENTS: Apple II series, Commodore 64, IBM or IBM-compatibles; a modem.

NUMBER OF STUDENTS ENROLLED: 17,000 households (each with one or more students) have registered since 1982 (E.U. administers courses from many different colleges and universities).

TIME SPENT IN CLASSROOM: MBA degree requires approximately two weeks of classroom seminars. Some science courses have lab requirements that can be fulfilled at any local community college.

EXAMINATION: Proctored final exams are given at a library or college in your area. NOTE: Courses are taught and delivered on-line through Electronic University by instructors at colleges and universities across the country, such as Ohio State University, Thomas A. Edison University in Trenton, New Jersey, and University of Pennsylvania. All credits will be recorded at the sponsoring college or university.

Executive Masters Program, Purdue University

ADDRESS: Krannert Center for Executive Education and Research, West Lafayette, Indiana 47907 (317) 494-7700.

DEGREES OFFERED: Master of Science in Management.

NUMBER OF COURSES OFFERED: 12 (for degree candidates only).

COSTS: $22,000 to $24,000 for graduate program, depending on whether the student already has a computer and modem, or chooses to purchase one at a special rate through the university. This cost includes all books, lodging, and other fees.

HARDWARE REQUIREMENTS: Apple Macintosh/Macintosh Plus, Macintosh modem.

NUMBER OF STUDENTS ENROLLED: 60

TIME SPENT IN CLASSROOM: Students must spend 12 weeks on campus over a two-year period.

EXAMINATION: There are two-day exam periods at the end of each semester.

Nova University Center for Computer-Based Learning

ADDRESS: 3301 College Avenue, Fort Lauderdale, Florida 33314 (305) 475-7047.

DEGREES OFFERED: One master's degree: Master of Science in Computer-Based Learning; Specialization in Training and Learning; three doctorate degrees: Doctor of Arts in Training and Learning Technology, Doctor of Arts in Information Science, Doctor of Education in Computer Education.

NUMBER OF COURSES OFFERED: 17

COSTS: Master's degree: $2,700; Doctoral degree: $3,700

HARDWARE REQUIREMENTS: Any computer and modem.

NUMBER OF STUDENTS ENROLLED: 175

TIME SPENT IN CLASSROOM: Students working toward a master's degree must spend two weeks on campus in Florida each year, once during the start of the program and once at the close of the program. These two sessions are intended to augment the on-line work conducted during the year. Those in the doctoral program must attend a seminar once every three months.

EXAMINATION: Doctorate students take exams at the seminars, while master's students take exams on-line.

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CIRCLE READER SERVICE 6

COMPUTING CLINIC

In his series on computer maintenance, Henry Beechhold describes how to make cables. Can you furnish me with a supplier that sells plugs at reasonable prices?

H.W. ANTON
Chicago, Illinois

Heath/Zenith and Radio Shack stores both carry plugs and connectors at various prices. If you're not buying in quantity, don't expect any earth-shattering bargains. A mail-order house that can supply plugs, sockets, and connectors is Otto Electronics (895 Route 130, East Windsor, NY 08520; [609] 448-9165).

To get the best prices, attend one of the many computer fairs and flea markets that bloom like tulips through the warmer months on college campuses. You may be able to find used connectors. Know what you want beforehand, and be prepared to haggle. However, you may have to do a certain amount of desoldering of old wires, etc., before old parts are usable. —H.B.

I have questions about the Tandy 1000 my father bought for me. How compatible is the 1000 with the Tandy Color Computer, or the Tandy Model III/4? How compatible is the 1000 with the IBM PC, XT, AT, and PC*jr*?

CHERYL MALLETT
Dillon, South Carolina

In the computer sense, "compatible" means that a computer can run the same software and use the same add-ons as another computer. The Tandy 1000 is not at all compatible with the Color Computer, or Model III/4. The machines are totally different.

The 1000 runs most IBM PC and XT software, including all the major business packages. However, much IBM PC software requires more memory to run on the Tandy 1000 than on the IBM PC. The AT runs most IBM PC software, but programs that run only on the AT, not the PC, will not work on the 1000 either.

The 1000 cannot use all the hardware designed for the IBM PC family. Long expansion cards will not fit inside the smaller Tandy; short- and medium-length cards will fit.

Of all the computers you list, the Tandy 1000 is most compatible with the IBM PC*jr*. Both can display 16 colors at once in medium resolution (compared to four on the standard IBM PC), and both have three-channel sound output (compared to one channel on the IBM PC). However, since most software is written to work on the IBM PC, you won't find much that takes advantage of the 1000's sound and color capability. —N.S.

Is there a way to get lower-case letters on a Tandy Color Computer?

JULIO HERNANDEZ
Los Angeles, California

LowerKit III ($67.50), from Green Mountain Micro (802) 485-6112, gives you lowercase letters. You can get an 80-column display and lowercase letters with *WordPak-RS* ($100) and a "Y" cable ($30) from Spectrum Projects, Inc. (718) 441-2807. However, to see 80 columns clearly, you'll need a hi-res monitor instead of a television, which most CoCo owners use. —N.S.

I recently purchased a second-hand IBM PC*jr* with a Racore Drive Two because it had a number of programs included, specifically Lotus *1-2-3*. However, I find that I am unable to run the Lotus disk. After a few minutes, the program quits running or I get colors flashing all over the screen. All the work I do for myself and my company is on Lotus spreadsheets. Without the program, the PC*jr* system is of little use to me. Can you help?

BETTY CHURCHILL
Arvada, Colorado

Let's hope so! You can run the Lotus *1-2-3* cartridge version on a PC*jr* with 128K and one disk drive. But the problem you describe stems from using the IBM PC version 1A of *1-2-3*. The Lotus *1-2-3* color graphics driver for the PC*jr* is different from the driver for the PC. To run

Questions are answered by HENRY BEECHHOLD, *author of the six-part series on Computer Maintenance; and* NICK SULLIVAN, *senior editor. Due to the volume of mail, we regret that we cannot acknowledge or answer each letter.*

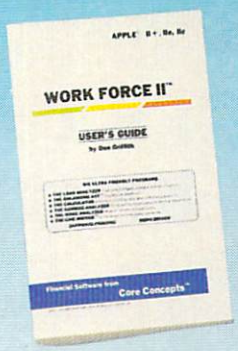
the disk version of Lotus on the PCjr with the Racore Drive Two, you need DOS 2.1, 256K RAM and the PCjr *Installation Kit*. This software allows you to "install" the proper drivers for color graphics. You can get the PCjr *Installation Kit* free from Lotus. Call (617) 577-1100, and ask for Information & Warranty. —N.S.

Recently I got an Apple Scribe printer. Apple says I don't need any thermal paper, but my dealer says I do. Who's right?
DANIEL LENDA
Dearborn Heights, Michigan

Apple is right. The Scribe is a thermal transfer printer (not a thermal printer) that melts ink onto paper. Your dealer is confusing the two thermal technologies; the old-fashioned thermal printers did indeed require special thermal paper. With thermal transfer printers like the Scribe and Okimate 10 and 20, any paper will work. Thin or smooth paper (that's often cheaper) will give you better results than heavy, coarse paper with a high rag content. —N.S.

We have children ages 4, 6, and 8, and a resort business of our own. We are entertaining the purchase of a computer. We want "dollar value" but more importantly a computer that a) is not too complicated to figure out; b) can be used for recreation, education, and our small business; c) won't become obsolete too soon; d) can grow with the kids and our competence. As a first time customer and complete novice, how can we make an intelligent choice?
NORMAN BATEMAN
Mill Creek, California

For starters, read the various Buyer's Guides in FAMILY COMPUTING. The October 1985, November 1985, March 1986, and June 1986 issues have information on all the popular computers. The two computers you should probably look at first are the Apple IIc and the Tandy 1000. Both will meet your needs, as you state them. However, depending on the size of your business and what part of it you plan to computerize, you might find that using one computer for both you and your kids is a no-win proposition for both parties. —N.S.



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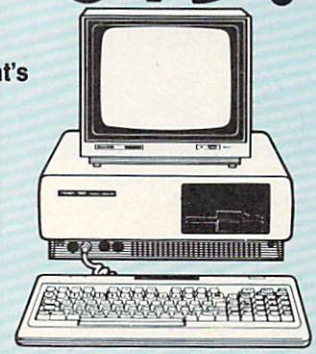

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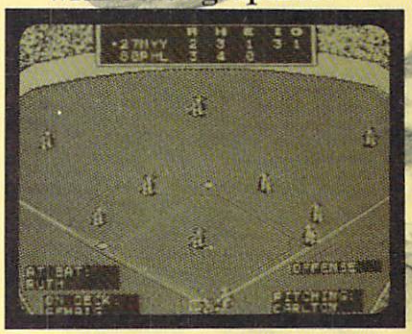

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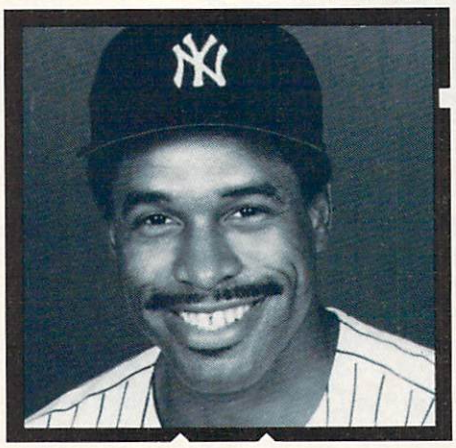
CIRCLE READER SERVICE 27

CELEBRITY SOFTWARE

DO EXPERTS HELP?

HERE'S A RUNDOWN OF 14 PROGRAMS FROM PROS AND HOW THEY STACK UP AGAINST BOOKS AND VIDEO.

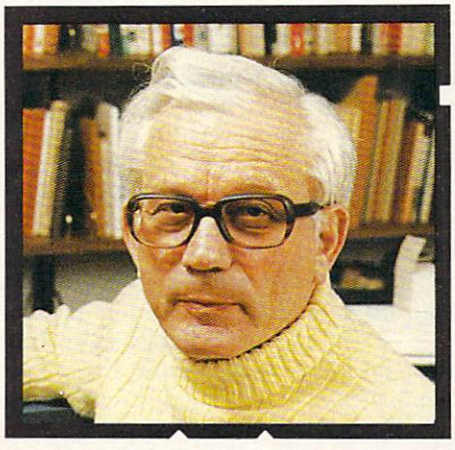
BY ABIGAIL REIFSNYDER



Dave Winfield

Sylvia Porter

Alfred Sheinwold



Charles Schwab

It may well be that a rose by any other name would smell as sweet. But if someone says "rose," you know what scent to expect. If Clint Eastwood comes out with a new movie, you can safely assume that he will play a terse and unsmiling tough guy. Now if John McEnroe says Bic razors give a closer shave, it doesn't necessarily mean a lot to us. If, on the other hand, McEnroe tells us to play the net under certain circumstances, we are likely to take that advice more seriously. Tennis is, after all, his life.

Names mean a lot to us. We associate a range of characteristics with different names. And famous names—the names of experts in their fields, whether it's tennis or business—mean even more. They generate expectations of expertise—advice we can trust.

But these days, we're accustomed to seeing famous people endorsing all kinds of products. So when we see Dave Winfield's name on a baseball computer program, we have no way of knowing what, if anything, he had to do with the program. The fact that it's a baseball program is already a good sign; after all, you would rather get batting tips than, say, advice on playing bridge from Dave Winfield. Beyond that, though, is the question of whether you stand to gain from batting tips offered in a computer program. Would you be better off taking a bat and Winfield's book to the playground?

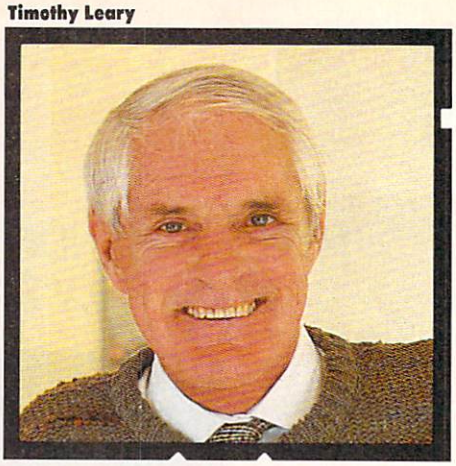
How involved was the celebrity with the making of a given computer program, and, *Is the program better than a book or video?*

We asked these two questions about 14 celebrity programs: *The Isgur Portfolio System, Andrew Tobias' Managing Your Money, The Running Program by Jim Fixx, Dave Winfield's Batter Up! Joe Theismann's Pro Football, Play Bridge With Sheinwold, Timothy Leary's Mind Mirror, J.K. Lasser's Your Money Manager, Sylvia Porter's Your Personal Financial Planner, Charles Goren: Learning Bridge Made Easy, The Evelyn Wood Dynamic Reader, Charles Schwab's Financial Inde-*

**There's a name for it
And names make all the difference in the world
—David Byrne,
Talking Heads**

Lee Isgur

Timothy Leary



**"YOU HAVE TO TAKE THE CELEBRITY AND MARRY HIM OR HER TO A TECHIE. AND THE TECHIE HAS TO BE SOMEONE WHO CAN COMMUNICATE."
—Lee Isgur**

pendence and *The Equalizer*, and *Julius Erving and Larry Bird Go One-on-One*.

THE DEGREE OF INVOLVEMENT

As you might expect, the degree to which the celebrity was involved in the actual development of these 14 programs varies dramatically—from practically writing the code to merely giving the final okay.

There is no rule—at least no rule without exceptions—by which to judge the quality of celebrity software based on the individual's involvement. It is fair to say, however, that more involvement is better because it ensures that the person you expect to have designed the software really gave it his or her best shot.

Lee Isgur. One of the foremost investment analysts in the country and a PaineWebber analyst for nine years, Isgur was about as involved as a person can be without actually writing the code for the program that bears his name. *The Isgur Portfolio System* is the product of Isgur's frustration with portfolio management packages.

For years Isgur has been tracking his portfolio with a computer, progressing from VIC-20, to a Tandy, an Atari 800, and a Compaq. He moved from *VisiCalc* to Lotus *1-2-3*, creating his own templates to track investments. His templates were so good and in such demand that at one point he had them up on CompuServe. But he was still frustrated. "I didn't want to waste nine months writing templates before the spreadsheet program did what I wanted," he recalls. "But the problem was that I must have bought four or five specialty portfolio packages until I realized that they didn't do what I wanted them to do."

So Isgur hooked up with his long-time friend Michael Reichmann, president of Batteries Included, and they decided to put together a portfolio program. Working evenings and weekends, Isgur and programmer Mark Skapinker put together all the elements Isgur felt were missing from other portfolio management programs. Isgur believes that his knowledge of the different kinds of things that can happen on Wall Street helped make the program complete. "We used our experience with all the crazy ways we have invested in the past," he says. "My thought was that the program had to be extremely flexible so that it could accommodate whatever the investor's needs were."

Somewhat of a programmer himself, Isgur nevertheless feels that most programs are intimidating. To combat this, he had his 72-year-old mother test the program. She had never used a computer before, so Isgur felt they had succeeded in creating an understandable program when his mother was able to use it. Despite its ease of use, the program is so powerful that Isgur and several of his PaineWebber associates actually use the program at work.

Timothy Leary. Timothy Leary's *Mind Mirror* is, as he puts it, "based on 25 years of research I've done on interactive, interpersonal psychometrics." To Leary, his computer program is a natural extension of his work. "From the beginning of my work back in 1948," he explains, "I've been developing tools. I know I have a reputation for being other things, but I'm basically a tool person— I create tools to give individuals more control and power over their own mind."

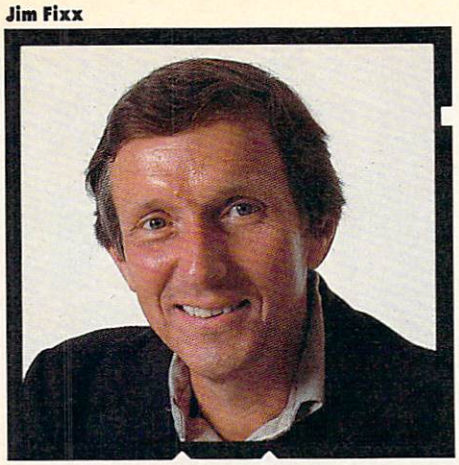
Leary had published a set of tests to be taken with pencil, paper, stencils, and templates—tests designed to analyze thoughts and break them down into small parts to help the individual understand them better. "But it was very clumsy; it's only with the computer that you get this fast interaction," he says. "As fast as you can think, your thoughts are jumping around on the screen."

Leary, like Isgur, worked closely with the programmers. In fact, Leary and two programmers, Peter van den Beemt and Robert Dietz, had done pilots and demos for the program before contracting with Electronic Arts.

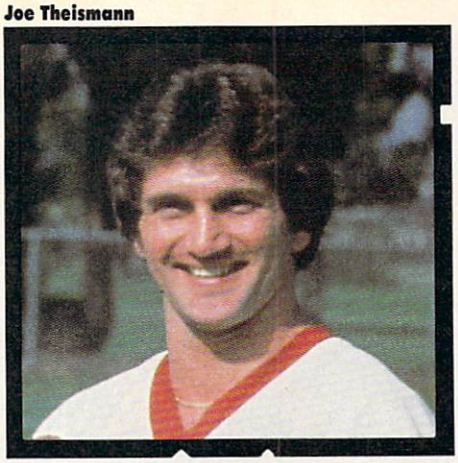
Andrew Tobias. The author of *The Only Investment Guide You'll Ever Need* was approached by MECA to do a program to manage home or small-business finances. "It seemed like it might be worth trying," Tobias says, "but I never imagined *Managing Your Money* would become half my life." Tobias told MECA's programmers what he wanted to see in the program and wrote all the text that appears in it—little bits of advice, help screens and prompts. He also writes the quarterly newsletters that go to *Managing Your Money*

ABIGAIL REIFSNYDER *is a freelance writer who specializes in computers and video. Her last article for* FAMILY COMPUTING *was "Buyer's Guide to Graphics Software," in the February 1986 issue.*

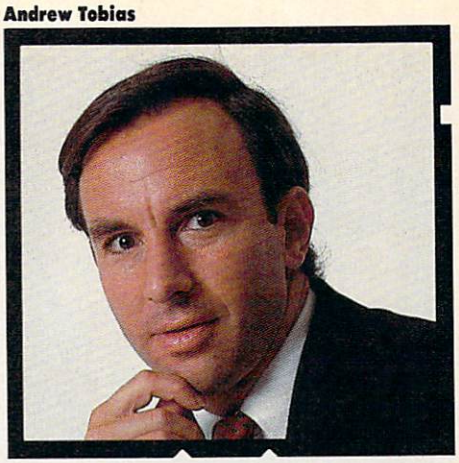
Jim Fixx



Joe Theismann



Andrew Tobias



users who purchase MECA's deluxe warranty.

Jim Fixx. The late runner Jim Fixx was amused with the idea of developing an individualized running program, according to Pam Neiditz, who worked closely with Fixx on *The Running Program*. "He had very definite opinions about what it should do and how well it should do it," says Neiditz. "There is a lot of analysis in the product, looking at factors that affect a race performance, and training factors like speed work, pace, total distance, and diet. A lot of runners try to keep those statistics and work up those kinds of numbers, but it's a laborious, painstaking process. And I think a lot of them drop that because it's a pain in the neck." Fixx wanted to create a program that would make that process easy, so runners could better understand how they were doing, not just generally but very specifically.

Charles Schwab. Though not involved in the day-to-day process of program design, Charles Schwab was the impetus behind *Financial Independence* and *The Equalizer*. "They would not have occurred without him," says John Frierson of Charles Schwab & Co., the leading discount brokerage firm. "There was, to some extent, resistance within the company itself because software was uncharted territory.

However, the software that bears his name is directly related to his business. People are using personal computers, and there are certain things that computers do very well. And some of them apply directly to the philosophy that Chuck Schwab had from the beginning. That is to put control of investment transactions in the hands of individuals, not in the hands of some broker.

The Equalizer was developed, he says, to do three things: to allow people to trade stocks on-line; to manage a portfolio; and to access the same information available to stock brokers. "That's the way Chuck does his business. I mean, he uses the software himself, so the product reflects his own point of view," says Frierson. *Financial Independence* was "generated as a tutorial to help individuals get a better handle on the complexities of today's financial world—to enable people to look at taxes and get a better hold on their family budget," he adds.

Julius Erving/Larry Bird. Julius Erving and Larry Bird illustrate yet another kind of celebrity involvement. Electronic Arts first developed a rough version of a one-on-one basketball game, then showed it to Erving. He spent a day with the program designers—brainstorming, explaining how he would play against Bird in a wide variety of circumstances, and how one-on-one games differ from full team games. Erving wanted to do something with computers and he wanted to create a product that children might relate to. Bird, on the other hand, was involved in the design process only minimally. Both played before the company's cameras so the animation for the program would be realistic.

Equally important is the quality of the programmers working with the celebrities. Eric Hammond, who programmed *One-on-One*, did a fabulous job, so the fact that Erving and Bird weren't standing over his shoulder doesn't seem to matter. As Lee Isgur says: "What you need to do here is take the celebrity, marry him or her to a techie. And the techie has to be someone in the real world. I mean, it has to be someone who can communicate. And then you can create a piece of software which is very elegant."

Joe Theismann, Alfred Sheinwold, Dave Winfield. Though still active in the design, Dave Winfield, Joe Theismann and Alfred Sheinwold were not as deeply involved as some of the other celebrities. All three wrote books that were used as the basis for the programs. In addition, Winfield drew diagrams for the programmers. Winfield and Theismann looked at the programs in various stages of development to give input as well as to grant final approval.

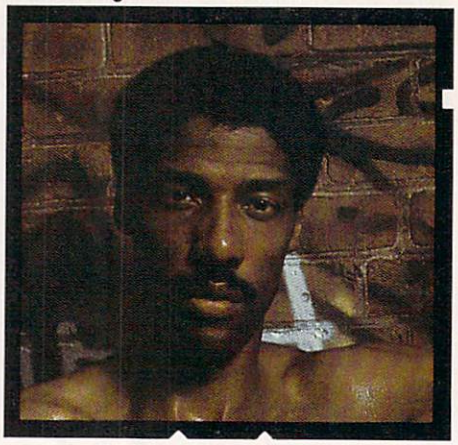
The Winfield, Theismann and Sheinwold programs are designed to teach or improve basic skills. The programs are not ones that the celebrities themselves would use. As a result, the impetus to stand over the shoulder of the programmer appears to have been less intense. Furthermore, these programs don't allow you to enter and analyze data about yourself as the finance and Fixx programs do.

Charles Goren, J.K. Lasser, Sylvia Porter, Evelyn Wood. Programs bearing the names of J.K. Lasser (deceased), Sylvia Porter,

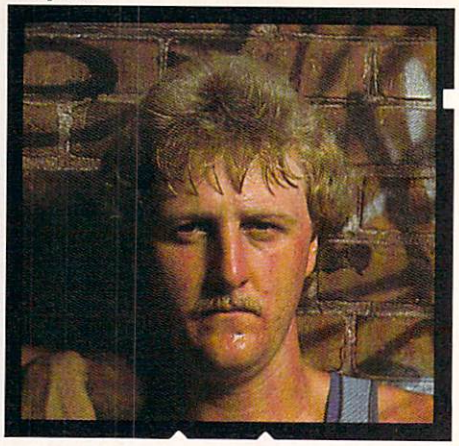
ERVING WANTED TO DO SOMETHING WITH COMPUTERS THAT CHILDREN COULD RELATE TO.

What's in a name?
—William Shakespeare

Julius Erving



Larry Bird



"I NEVER IMAGINED THAT *MANAGING YOUR MONEY* WOULD BECOME HALF MY LIFE"
—Andrew Tobias

Charles Goren and Evelyn Wood were not designed by these individuals but in conjunction with their organizations: The J.K. Lasser Institute, Sylvia Porter's *Personal Finance Magazine*, Goren International and Evelyn Wood Reading Dynamics, Inc. This does not necessarily mean, however, that you won't get what you expect from these names. These organizations do nothing but implement the philosophy that we associate with their founders' names. In using the programs, though, I couldn't help but think that if the individual whose name was on the package had sat down and really used the program, he or she might have made some changes.

SOFTWARE VS. BOOKS VS. VIDEO

Good or not, there is still the question of the appropriateness of the subject and the goals of the program to the computer medium. Of these 14 celebrities, nine have written books. And one, Jim Fixx, did a training video. So why were they all doing computer programs?

Finance. The case for computer programs can be made most clearly for the financial programs. Of the five financial personalities, all but Isgur have published books. But the advantages of the programs are obvious. They offer a capability impossible with a book. The program allows you to actually budget and track expenses rather than simply read about the importance of doing so. As Tobias puts it, "It's the difference between a cookbook and a kitchen. A cookbook is a great way to learn things and it'll tell you how to cook, but it won't cook anything. My little investment guide, I hope, gives people good, simple, prudent, boring, common-sense advice. But it doesn't do anything. The program has that advice in it, but basically it's not about advice. It's like a kitchen with a brand new microwave oven, a refrigerator with ice in the door and six-or-eight different appliances; it will indeed keep your budget, does a cash flow analysis, and performs dozens of other things for you."

None of the financial experts felt that video was the appropriate medium to convey financial information or advice. Video is more expensive than a book, while not delivering anything extra. Nevertheless, financial correspondent Robert Krulwich made a video for MGM/UA Home Video, "The Joy of Stocks: *Forbes'* Guide to the Stock Market." Organized in chapters that can be replayed with quizzes at the end of each, the tape is informative. Further, Krulwich's humor makes the learning experience painless. Thus while there are clear differences between financial software and books, video and print seem about equal.

Sports. The lines cannot be as easily drawn with sports programs. Though Jim Fixx was the only sports figure to dabble in all three media, both Winfield and Theismann have written books, and there are a number of video tapes on baseball, running, tennis and other sports topics. In this case, the goal of the program makes the difference. If the point is to learn strategy, then both print and computer software seem most appropriate. But to learn how to swing a baseball bat or to perfect your tennis backhand, the visual images and the ability to rewind and watch in slow motion make video more effective.

Bridge. The computer's interactivity and its ability to generate new situations make it particularly effective for practicing bridge techniques. Though both Sheinwold and Goren have written books (which come with the software), the programs allow these experts to do more than simply explain how a specific hand should be played. Goren International president Tannah Hirsch explains, "In books, there are only limited examples. You can only give so many quizzes and no more. On the computer, we have random deals for each quiz, so you can carry on with any one particular subject." Sheinwold feels that bridge software is an extension of the old game Autobridge, but that it is quicker and allows more interactivity.

Bridge videos also exist, including "Win at Bridge with Eddie Kantar" and a new video, "Play Bridge with Omar Sharif," from Goren International. Why a video? Goren's Hirsch says the video is geared to a different, more bridge-sophisticated audience. Sheinwold agrees: "A video lets you see and hear a good teacher or entertainer in action. And to repeat the experience as often as you like without embarrassment. There are elements to a video

you don't get in a book or software—the personal contact and the experience of the whole personality."

Reading. *Evelyn Wood's Dynamic Reader* poses an interesting problem. Though the computer offers the ability to time the reader, flash sentences or phrases on the screen, and keep track of the reader's progress—reading from the computer screen is both different and more difficult than reading from the printed page. The advantages and disadvantages of either print or computer software seem to balance out.

Psychology. With Leary's *Mind Mirror*, however, the advantages of the computer are clear. Leary's entire philosophy is based on interactivity, which is the computer's forte. He states the case for his program clearly: "I'm embarrassed to say it, but I now call books fiber based storage systems or wood-pulp computers. I write a book and people sit there docilely reading it. With the program, at the end of every paragraph, you interact. That allows you to join the polarity of author-reader."

GOLDEN RULES

With celebrity software—with all software, for that matter—there are several issues that consumers should consider. Most important is the appropriateness of the medium to the subject. Simply keep in mind that print offers only one-way information, but is easily transportable and relatively inexpensive. Video offers visual impact and the ability to repeat and to view actions in slow motion, but it is more expensive. Computer software can offer interactivity, and it can be customized with any individual's data. But some programs do not take full advantage of these capabilities.

While celebrities don't guarantee better software, their names generally allow you to quickly determine what you're likely to get. Andrew Tobias is known for making complicated financial issues understandable to a lay audience, so it's safe to expect him to do that in his program. Similarly with Sylvia Porter, or so you'd think. But here's the exception. Porter's *Your Personal Financial Planner* turns out to be more difficult to use than Charles Schwab's *Financial Independence*, exactly the reverse of what you might expect. So, while the name on the package can give you a rough idea of what to expect, the golden rule of software buying still applies: get a demo of the program before you lay your money down.

With luck, you'll find a program that perfectly blends the subject matter, the hand of the expert designer, and the skill of the programmer. As Tobias says: "This program (*Managing Your Money*) is for me. Just as, if you ask a writer who he writes for, he'll tell you he writes for himself." And as Isgur says: "I consider this program (*The Isgur Portfolio* System) a success because I now have the piece of software I want." FC

CELEBRITY SOFTWARE

Title Publisher Price	Brief Description	Hardware Required
J.K. Lasser's Your Money Manager Simon & Schuster 1230 Ave. of the Americas New York, NY 10020 (212) 245-6400 $89	A financial management program that help keeps track of assets, liabilities, income, and expenses. (*Reviewed September 1985.*)	128K Apple, IBM PC/PC*jr*. Planned for C64 and Macintosh.
Sylvia Porter's Your Personal Financial Planner Timeworks 444 Lake Cook Road Fairfield, IL 60015 (312) 948-9200 $70-$120	Manages money on a day-to-day basis and plans your financial future. (*Reviewed April 1986.*)	128K Apple, C64, C128, IBM PC/PC*jr*. Planned for Macintosh.
Andrew Tobias' Managing Your Money MECA 285 Riverside Ave. Westport, CT 06880 (203) 222-1000 $199	Seven integrated programs in one; will help you organize and analyze your personal financial affairs and perform basic to complex functions. (*Reviewed December 1985 and November 1984.*)	128K Apple IIe/IIc, 192K IBM PC/256K PC*jr*.
The Isgur Portfolio System Batteries Included 30 Mural Street Richmond Hill, Ontario L4B 1B5 (416) 881-9941 $200–$250	An understandable and flexible portfolio management system for the serious investor.	Atari 520ST, 512K IBM PC. Planned for Amiga and 512K Macintosh.
Charles Schwab's The Equalizer Schwab Investor Information 101 Montgomery Street San Francisco, CA 94104 (800) 334-4455 $200	An on-line trading package that incorporates research from Standard & Poor's Market Scope, Dow Jones, and on-line trading from Charles Schwab.	128K Apple, IBM PC.
Charles Schwab's Financial Independence Schwab Technology Services (*See above for address.*)	A financial planning package for investors who manage their own portfolios.	48K Apple, 256K IBM PC.
SPORTS		
The Running Program by Jim Fixx MECA (*See above for address.*) $80	Health and fitness package that allows serious runners (from novice to marathon) to analyze their performance. (*Reviewed July 1985.*)	IBM PC/Tandy 1200 with 128K; IBM PC*jr*/Tandy 1000 with 256K. IBM PC, PC*jr*.
Julius Erving & Larry Bird Go One-on-One Electronic Arts San Mateo, CA 94404 (415) 571-7171 $35	A colorful and realistic basketball game with face-off between Larry Bird and Julius Erving. (*Reviewed May 1984.*)	64K Apple, Atari, C64/128, IBM PC/PC*jr*, Macintosh, 256K Amiga, 512K Amiga.
Dave Winfield's Batter Up Avant Garde 37B Commercial Blvd. Novato, CA 94947 (415) 883-8083 $35-$40	Practice your swing with tips from the pro; then try to hit "it" out of Yankee Stadium. (*Reviewed July 1985.*)	64K Apple, C64/128, IBM PC/PC*jr*.
Joe Theismann's Pro-Football Avant Garde (*See above for address.*) $35–$40	Learn how to read defenses and call plays with strategy from a Super Bowl quarterback.	64K Apple, C64/128, IBM PC/PC*jr*.
BRIDGE		
Charles Goren: Learning Bridge Made Easy CBS Software One Fawcett Place Greenwich, CT 06836 (203) 622-2500 $80	An interesting and easy way to learn the world's most fascinating card game. Comes with a teaching book.	48K Apple, C64/128, IBM PC.
Play Bridge with Alfred Sheinwold Great Game Products 8804 Chalon Drive Bethesda, MD 20817 (800) 426-3748 $30	Entertaining and instructive bridge game to test and tease the computer-literate bridge player. Includes "Bridge Puzzles" book.	48K Apple, C64/128, IBM PC. Planned for Atari 520ST and Macintosh.
OTHER		
The Evelyn Wood Dynamic Reader Timeworks (*See above for address.*) $50-$90	An effective and enjoyable way to improve reading comprehension and speed. (*Reviewed April 1985.*)	48K Apple, C64/C128, IBM PC/PC*jr*. Macintosh.
Timothy Leary's Mind Mirror Electronic Arts (*See above for address and phone.*) $33–$40	Part tool, part game, and part philosopher, this program allows you to analyze your thoughts and stereotypes.	IBM PC/PC*jr*. with color/graphics adapter. Planned for 64K Apple, and C64/128.

Leisure-Time & Rainy-Day Software

(That's Also Great When the Sun Shines) PROGRAMS TO HELP YOU SHAPE UP, EAT WELL, AND HAVE FUN WITH YOUR ENTIRE FAMILY

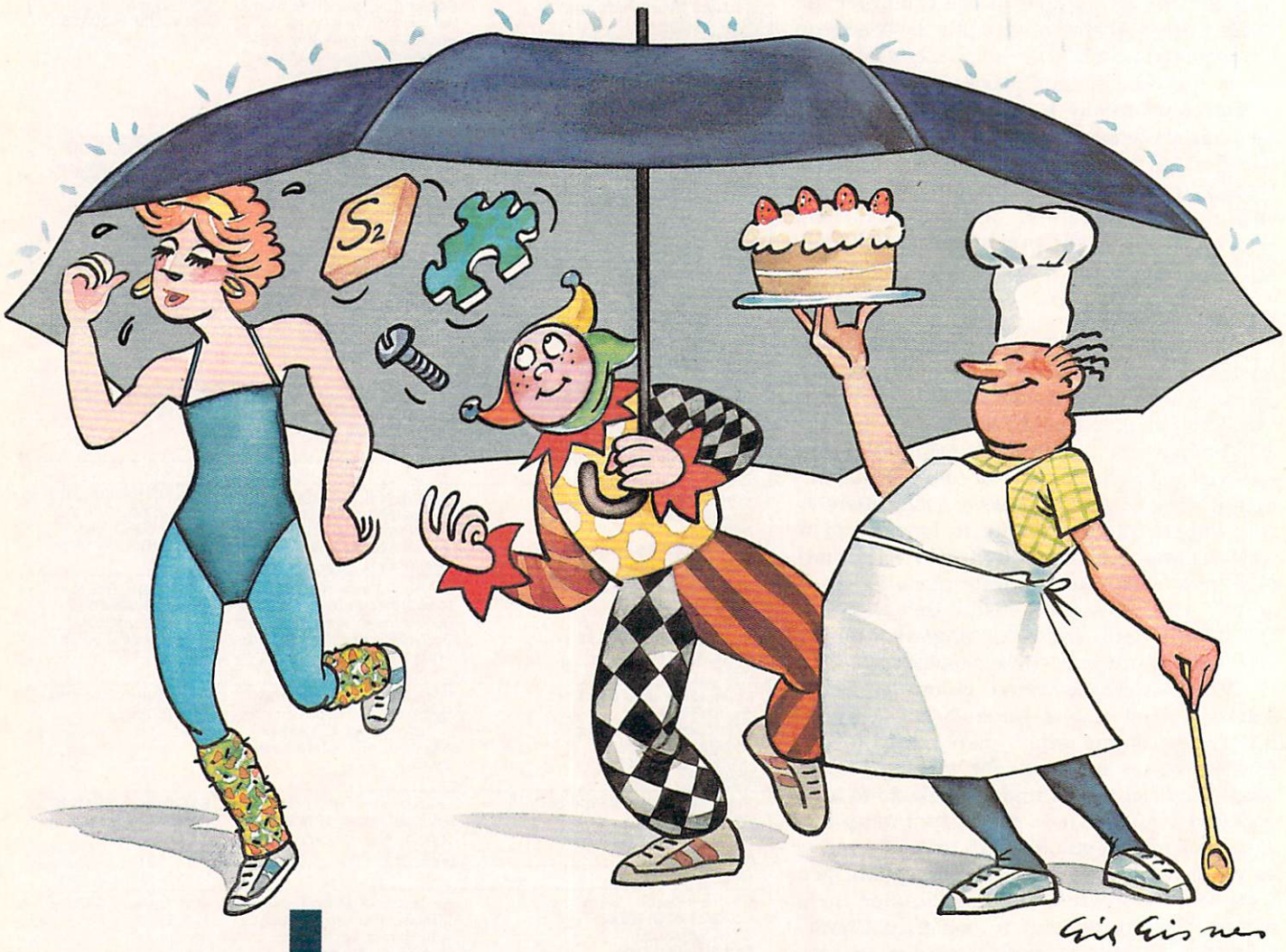


ILLUSTRATION BY GIL EISNER

BY DAN PERSONS

I love summer. It's a time for *doing*. And, with the right software, your computer can help you get more out of the season. Programs abound that will help keep you trim, let you make finger-licking meals for picnic or patio, and even keep everyone entertained when you want to slow down or when the weather's less than ideal.

SHAPE UP

The thought of getting into a bathing suit that advertises every bump and bulge is enough to send some people running to the nearest gym. If that's you, relax; you're in good company. Whatever inspires you to take those pounds off and prolong your lifespan, software publishers have the packages to help you meet your goals.

Already something of a classic, ***Aerobics*** from Spinnaker Software is a full-fledged aerobics program that touches all the bases, from the warm-up to the actual exercises, and on to the cooling-down period. The graphics are simple but clear, while the background music is a pleasant combination of disco and "synthe-pop." There are beginner, intermediate, and advanced exercises, as well as sessions to tone up specific areas. No matter which level you choose, check out the well-written instruction manual for details, and

DAN PERSONS *works as a programmer, and also writes about software and computers.*

watch the session first so you don't waste time fumbling for the right position.

If, however, you'd prefer to be jogging outside, taking in the fine summer sunshine, then you're ready for ***Maximizer Personal Running Coach*** by Fitness Software. Select your training level, and *Maximizer*'s built-in "coach" sets up a program that stretches over a fixed number of weeks (the beginner's program takes 12 weeks), with distances, pace, and running surfaces varying according to your day-by-day progress. You enter each day's results in the system's record keeper, along with information on your pulse rate, weight, and whether or not you sustained any injuries or muscle strains during your run. Afterward, you can view or print out progress reports based on the statistics you've entered, as well as graphs that present the information in a bar chart.

Maximizer is not for those who want to dabble in a little weekend jogging. It demands persistence and dedication—but, mercifully, only if you demonstrate that you can take it (or as the coach says: "Don't be crazy, but don't be lazy"). As a record keeper and coach, *Maximizer* is fine. However, if you know little about running, it would pay to use a program oriented more toward beginners, such as Jim Fixx's ***The Running Program***. (*This package, along with some other sports programs, is described in "Celebrity Software" on page 23.*)

Those who are serious about their exercise will want HRM Software's ***Cardiovascular Fitness Lab***, a package that provides real-time heart rate readings through a small, clip-on sensor that attaches to either your earlobe or the fleshy part of a finger. The software allows you to see these readings as graphs, but most exercisers will no doubt opt for the training module, which was created specifically for aerobics. It provides an on-screen timer, a digital heart rate counter, as well as a vertical gauge to show when your heart rate falls within a selected range. The package has been carefully designed: on-screen letters and numerals are clearly visible from a distance, while an extension cord for the sensor lets you perform aerobic workouts without having to lean over your computer.

SLIM DOWN

There's no point in exercising if you're not going to watch your diet. Camde's ***Nutri-Calc*** can help by preparing daily nutritional profiles for your whole family. Each day, you tell the program what you've eaten, and *Nutri-Calc* takes it from there, delivering an impressive variety of bar charts, pie graphs, and statistics about your diet. The Software Toolworks' ***MyDiet*** performs essentially the same functions. The data bases of foods in both programs are extensive; they include a fair selection of fast foods and even such dishes as braised hog hearts. *MyDiet* also has a special option for weight watchers that includes day-by-day calorie recommendations.

For those who can't wait to slim down, Bantam Software offers ***The Complete Scarsdale Medical Diet***, a computer version of the diet that promises an average weight loss of 14 pounds in two weeks. With a two weeks on, two weeks off method, the software diet's approach is simple: you fill in your personal statistics when you start off, then sign in each day with your current weight. The program designs weekly menus, letting you choose from such special categories as vegetarian, gourmet, and money-saver meals. At the push of a button, *Scarsdale* will print out the recipes as well as a weekly shopping list.

Scarsdale is an easy program to operate, but not necessarily an easy diet to follow; absolutely no substitutions are allowed. To help you along, there's a feature that lets you examine the protein, fat, carbohydrate, and caloric values of various foods, and shows you how much exertion it takes to lose weight gained from these foods. Did you know that it takes 30 straight minutes of disco dancing to burn off the calories found in a two-inch slice of chocolate fudge cake?

If you don't particularly need to fast-track your weight loss, you might be better off with ***The Original Boston Computer Diet*** from Scarborough Systems. Unlike *Scarsdale*'s stern do-it-my-way-or-else approach, *Boston* concentrates as much on modifying your behavior as it does on specifying menus. The diet program consists of daily appointments with a computerized counselor, whose personality ranges from "matter-of-fact" to "free-wheeling and breezy" (the choice is yours). You fill in a report on your previous day's food consumption, receive information on your progress, and prepare menus for the next day. *Boston* requires time and effort at the keyboard (an average session runs 30 to 45 minutes), as well as some patience before you see results, but in the end you should be able to walk away with not only a trimmer body, but also a good idea of how your moods can cause weight problems. The program doesn't teach you how to curb your emotions, so much as it shows you how to channel those emotions "away from eating and toward more constructive activities."

TAKE OFF THOSE POUNDS AND PROLONG YOUR LIFESPAN WITH PROGRAMS THAT'LL INSPIRE AND ORGANIZE YOUR WORK-OUTS

THE BEST THINGS IN LIFE ARE EATS

So you've exercised and dieted, counted your calories and toned your body to perfection. You deserve to celebrate . . . with a good meal. Recipe managers in one form or another have been around for years. The best of them can search files for a recipe category (such as "beef" or "dessert"), adjust ingredient sizes according to the number of servings, and draft a shopping list of required ingredients. All the

BUILD A MEAL OUT OF ODDS-AND-ENDS WITH THE SOFTWARE'S SPECIAL SEARCH FUNCTION

programs below can do these things; some can do more.

Rubicon Publishing's ***Dinner at Eight*** was designed specifically for the Macintosh, and it looks it. Within seconds of booting the disk, your Mac's desktop is turned into a tabletop. There, amidst flickering candles, are illustrations of the categories you can choose from, like beef, soups, and even "gourmet" fast food. Click the mouse on an illustration, and a listing of all appropriate recipes is displayed. A click on the dish that sounds most tempting gets the recipe itself.

And what recipes they are! Dishes included are culled from the kitchens of some of the country's finest eateries, places like Sal Anthony's in New York, Kan's Chinese in San Francisco, and Brennan's Restaurant in New Orleans. Using the mouse, you can page through ingredient lists, read directions, adjust portions, and route it all to a printer. Entering and accessing your own recipes is also simple.

Dinner at Eight is great for summer entertaining or for a romantic dinner for two. However, when it comes to cooking up something for the family, you might want to turn to The Software Toolworks' ***Computer Chef***. This homey helping of recipes, compiled by "three working mothers," emphasizes dishes that are tasty, nutritious, and easy to prepare. *Computer Chef* adds a touch that will be appreciated by anyone who has ever had to build a meal out of odds and ends—a search function that first lets you seek out recipes containing a certain ingredient, and then permits you to narrow down the choices by specifying additional ingredients.

Some of the recipes sound like dishes that would come out of a home-economics class, but most—such as Tuna Apple Salad, Vegetable Beef Soup, and Hungarian Stuffed Cabbage Leaves—have that comfy, just-like-mom-used-to-make feel to them. And for those who can't resist a touch of decadence, The Software Toolworks also offers a supplemental recipe disk called ***Chocolate Bytes***, that features such heart-stopping recipes as Double Deadly Chocolate Pie.

Somewhere between the sophistication of *Dinner at Eight* and the wholesomeness of *Computer Chef* lies ***A> Cook***, published by EHI. Actually more of a reference system than a cookbook, it lets you enter requests for specific categories, and then comes back with titles and page numbers for books that range from *The Joy of Cooking* to *The New James Beard Cookbook*. Only book references come supplied on the disk, but there is a system for entering complete recipes; it's easy to learn and to operate. If you have access to a lot of recipes, and you're willing to enter them into your computer, then *A> Cook*'s reference system can provide you with an organized collection of recipes.

RAINY (AND EVEN SUNNY) DAY FUN

Why suffer from rainy-day blues or too many hot days with no pool? Just huddle around the air conditioner with some of the unusual, appealing, and entertaining software around that provides perfect indoor fun for all.

You can't talk about rainy-day software without mentioning both Baudville's *Rainy Day Games* and Thorn EMI's *Rainy Day Fun*. ***Rainy Day Games*** is a one- or two-player program that features three classic card games: Concentration, Old Maid, and Go Fish. The games have been geared for children: pictures of dogs, birds, and other animals replace card suits, and the computerized opponent, Ted Bear, is not an aggressive player. Adults may find the ultra-cute graphics a bit cloying, but the animation is nicely done and the games play easily enough for most children.

When faced with short attention spans, turn to ***Rainy Day Fun***—a computerized toy chest full of activities, 10 in all. The fun ranges from connect-the-dots games, sliding puzzles, and pin the tail on the donkey to creative activities like a mask maker, a coloring book, and a feature that prints out giant banners. In order to get the most out of this well-designed program, you need a dot-matrix printer. Without it, only a few of the options make sense.

When you're searching for a creative activity for the entire family, check out Broderbund's ***Fantavision***, an animation program of astonishing ease and flexibility. The secret of *Fantavision* is called "tweening," a process that frees you to specify only the starting and ending points of an action, with the computer smoothly covering all the points in between. Within minutes of booting the disk, you can set boxes, circles, and abstract shapes flying across the screen. With just a bit more effort, stick figures can run, dance, and somersault; faces can grin, frown, and wink; and all with such fluid grace that you'd be hard pressed to believe that it was created on your own computer.

Equally impressive is Mindscape's ***Bank Street Storybook***, a "story processor" that lets budding storytellers mate words to pictures with a minimum of effort. Instead of storing completed pictures on disk, *Storybook* remembers the instructions that created each image, and uses these instructions to build a program that can later be played back to redraw the story. This unique system allows for such unusual touches as rapid color changes, and even a bit of rudimentary animation. This is a personal favorite; it's the package I keep dragging out after other titles have been consigned to the closet.

Shaherazam's ***Mac-a-Mug*** is a souped-up face-builder program designed for play on the Macintosh. On-screen slide switches let you dabble not only with changes of hair, eyes,

lips, and so on, but also such secondary features as chin, eyebrows, and sideburns. Give the face character with some wrinkles, a bit of jewelry, and even a sweatband or baseball cap. What comes out on-screen and on your printer is a face so rich in detail that you'll be tempted to pin the mug-shot on your post office bulletin board.

If your imagination leans more toward the verbal than the visual, try ***Crossword Magic*** from Mindscape. Pick a topic, and begin by keying in words. *Crossword Magic* takes it from there, building a crossword grid right before your eyes. Finish it off by creating clues for the horizontal and vertical directions. In the end, you have a complete crossword puzzle that can be stored and played on-screen or printed out and passed around.

For crossword lovers who also own an Atari 520ST, there's ***Word for Word*** from Bay View Software. This is an accurate knockoff of the classic board game Scrabble, complete with a computerized opponent and gameplay that takes advantage of the ST's mouse-controlled operating system. For math wizards, Scholastic Software's ***Quations*** looks and plays like Scrabble, but uses numbers and arithmetic operators instead of letters. The goal: to build the longest possible equation out of both the tiles you hold and those already placed on the board. Up to three players can compete in one game.

Trivia buffs will find Quest Learning Systems' ***La Triviata*** a standout in an overcrowded field. This is no simple close-your-eyes-and-pick-one multiple-choice quiz: *La Triviata* makes you prove your knowledge; it requires you to type in all answers. (Those with a phobia of keyboards needn't worry; the system has been designed to allow for minor misspellings.) Skill levels and subjects are varied, and some of the questions are real beauts—things like "Who was the main detective in the Swedish series of mystery novels by Wahloo and Sjowall?" ("Martin Beck," if you're dying of curiosity.)

Anyone who's really into brain teasers will enjoy ***Fix It*** from Random House Software. The object is simple: all you have to do is build a machine that will carry a bolt from its wrench to a holding bin. Well and good, but to get the job done you have to install devices that change the bolt's direction, or fix the bolt's size, or correct its color. There are 200 machine kits on disk. They range from ridiculously simple to "you've got to be kidding!"—and you can try your hand at building a machine from scratch. If you like what you've come up with, save it to disk to stump other intrepid kit builders. Younger children might be better off with Bantam Software's ***Creative Contraptions***, a similar but simpler program that lets a player complete Rube Goldbergian gadgets that do very silly things indeed.

SUMMER SOFTWARE INFORMATION

A> Cook. EHI, (516) 324-2224. IBM PC/PC*jr*. $40. **Aerobics**. Spinnaker, (617) 494-1200. Apple, C 64/128. $25. **Bank Street Storybook**. Mindscape, (312) 480-7667. Apple, C 64/128, IBM PC/PC*jr*. $30–$40. **Cardiovascular Fitness Lab**. HRM Software, (914) 769-7496. Apple. $175. **Chocolate Bytes**. The Software Toolworks, (818) 986-4885. IBM PC/PC*jr*. $30. **The Complete Scarsdale Medical Diet**. Bantam Software, (212) 765-6500. Apple, IBM PC/PC*jr*. $40. **Computer Chef**. The Software Toolworks, (818) 986-4885. IBM PC/PC*jr*. $30. **Creative Contraptions**. Bantam Software, (212) 765-6500. Apple, C 64/128, IBM PC/PC*jr*. $30–$40. **Crossword Magic**. Mindscape, (312) 480-7667. Apple, C 64/128, IBM PC/PC*jr*. $50. **Dinner At Eight**. Rubicon Publishing, (512) 454-5004. Macintosh. $60. **Fantavision**. Broderbund Software, (415) 479-1170. 64K Apple. $50. **Fix It**. Random House Software, (212) 751-2600. Apple, C 64/128, IBM PC/PC*jr*. $20–$30. **LaTriviata**. Quest Learning Systems, (612) 698-2789. Apple. $30. **Mac-A-Mug**. Shaherazam, (414) 442-7503. 512K Macintosh. $60. **Maximizer Personal Running Coach**. Fitness Software, (315) 824-1256. IBM PC/PC*jr*. $80. **MyDiet**. The Software Toolworks, (818) 986-4885. IBM PC/PC*jr*. $50. **Nutri-Calc**. Camde Corp., (716) 473-5330. Apple, IBM PC/PC*jr*. Macintosh. $80–$100. **The Original Boston Computer Diet**. Scarborough Systems, (914) 332-4545. 64K Apple, C 64/128, IBM PC/PC*jr*. $50–$80. **Quations**. Scholastic Software. (212) 505-3501. Apple. $40. **Rainy Day Fun**. Thorn EMI, (714) 261-6600. Apple, C 64/128. $40. **Rainy Day Games**. Baudville, (616) 957-3036. 64K Apple. $30. **Where In The World Is Carmen Sandiego?** Broderbund Software, (415) 479-1170. 64K Apple. $40. **Word For Word**. Bay View Software, (408) 373-4011. Atari 520ST, IBM PC (with GEM Desktop). $40.

Unless otherwise indicated, minimum memory requirements are 48K for Apple, 128K for IBM PC/PCjr, and 128K for Macintosh.

And, for everybody with a streak of the globetrotter, there's Broderbund's ***Where In The World Is Carmen Sandiego?***. As a resolute detective, it's your job to track down the nefarious Carmen Sandiego and her gang of fiends. Their trail leads around the world, from Paris to Kathmandu, from Montreal to Moroni. At every stop you question witnesses and consult the included copy of the *World Almanac* to discover the villain's hideout. After a quick stop at Interpol for an arrest warrant, it's off to collar the baddie and close the case. Play is enhanced with colorful illustrations of the cities visited and with snippets of information about each destination. Who knows? After all the fun, players might walk away learning a few things about the world.

By now you might have realized that all these programs are almost as appropriate for winter, spring, and autumn as they are for summertime. But if the warm weather inspires you to do things like it does for me, then you'll appreciate the leisure-time pleasures that can be enhanced by your computer and software. FC

MAC-A-MUG CAN CREATE A FACE SO RICH IN DETAIL THAT YOU'LL BE TEMPTED TO PIN THE MUG-SHOT ON YOUR POST OFFICE BULLETIN BOARD

BUYER'S GUIDE TO LOW-COST IBM COMPATIBLES

BY NICK SULLIVAN

AS PC CLONES PROLIFERATE, THE MARKETPLACE GETS MORE CONFUSING. HERE ARE ANSWERS TO SOME COMMON QUESTIONS.

In the beginning (August 1981), there was the IBM PC. Next there was the Compaq Portable (November 1983), the first successful IBM compatible, which ran virtually all IBM software and hardware. In November, 1984, there was the Tandy 1000, the first low-cost ($999) IBM compatible from an established manufacturer. Then followed the Leading Edge Model "D" (September 1985), the first fully configured IBM compatible for under $1,500.

Now, there are more low-cost IBM PC compatibles than you can shake a stick at, starting at prices as low as $629! Independent computer stores have "house brand" PCs, which run IBM software. Scores of mail order houses have sprung up in the last two years, just to sell PC compatible systems (or "clones," as they are sometimes called). Established computer equipment manufacturers, such as Kaypro and Epson, have introduced low-cost PC compatibles. And some established mail-order concerns, such as 47th Street Computer in New York, even sell IBM PCs—the real thing—at breathtakingly low prices.

Many corporations that use IBM PCs in offices can now save thousands of dollars by buying these low-cost compatibles. More importantly, these low prices have brought cadres of individual buyers into the marketplace, some for the first time, some for the second or third time. Some use IBM PCs at the office and want a compatible at home; others don't use a computer at the office and want one at home; others are running full- or part-time businesses from home.

All are attracted by the large amount of software available. And the widespread use of PCs means that the machine will be supported with new equipment and by technicians for years to come. For many people, the emergence of the IBM PC as a standard and the accompanying low prices have taken the confusion out of the buying decision.

Yet, both novices and pros can be confused by the advertising for these PC compatibles, because the IBM PC and compatibles have traditionally been sold differently than most other computers. To help potential buyers choose the right machine, we've answered some of the most commonly asked questions about PCs. And, we've created and dissected a dummy ad (*see "How to Read an Ad" on page 34*), to help make sense of the specifications that PC-o-philes take for granted.

Q. Are all these PC compatibles legal?

A. Yes. A few years back IBM sued Eagle Computer and others for infringing on its copyrights, but now virtually all compatibles use a third-party BIOS (Basic Input/Output System), that emulates the functions of the IBM BIOS without duplicating it. Chances are that any PC computer you come across, whether it's made in Taiwan or Texas, will be a legal computer.

Q. How compatible are these PC compatibles?

A. Very. Unless otherwise noted, a computer advertised as "IBM compatible" is likely to run virtually all IBM PC and XT software. However, depending on the size of the system unit, not all the expansion cards designed for the IBM PC may fit. The full-length expansion cards are 14 inches; some are 10 inches; and the smallest (7 inches) are designed for the short slots in the PC XT.

Q. What's the minimum system configuration I need?

A. The minimum system should come with 256K RAM, two floppy disk drives, a monochrome monitor and an adapter. With this system you'll be able to run a fair amount of software. However, many computers now come with 640K, and that is obviously preferable. You'll eventually use that memory, especially if you want to use RAM-resident programs like *SideKick*.

Notice that many computers sold for less than $1,000 come with only ONE disk drive, NO monitor, and NO display card to connect the monitor. So the advertised low price is definitely a "come on."

Q. How can I tell from an ad whether a computer I've never heard of before is any good?

A. You can't. You can probably assume that the computer will run, just as all color televisions work. But the only way to tell whether the keyboard has the right feel, or if the fan is too noisy, is to try it out. And the only way to do that is to find someone who's bought one.

Q. A friend bought a PC compatible and tried to run *King's Quest*. It wouldn't run. How come?

A. Your friend probably has a monochrome monitor, and *King's Quest* is one of many programs for the IBM PC that requires a color graphics adapter and color monitor. Software with these requirements should say so on the package.

Be assured that this "problem" is not a problem at all, and doesn't reflect badly on a given computer. It's just the way the IBM PC was designed, and the compatibles have to live with that original design.

Q. Do all monochrome monitors display graphics?

A. All "IBM-compatible" monochrome monitors should be capable of displaying graphics, provided you have a monochrome graphics adapter. The standard monochrome adapter that connects your monitor to a PC is not capable of displaying graphics on the screen. To do so you need a monochrome graphics adapter.

The most commonly used monochrome graphics adapt-

MANUFACTURERS

THE DIVERSIFIED GROUP (213) 675-0717; EDUCATIONAL MICRO INC. (813) 985-0800; EPSON (213) 539-9140; JADE COMPUTER (800) 421-5500; KAYPRO (619) 481-4300; FOUNTAIN TECHNOLOGIES (212) 714-9595; LEADING EDGE (617) 449-4655; MAGNUM (800) 547-1289; MAIN STREET (800) 426-6246; PC DESIGNS (918) 252-5550; PC LIMITED (800) 426-5150; PC USA (212) 641-6953; SANYO (201) 440-9300; BRAND (800) 643-0992; TANDY (817) 390-2728; TEXAS COMPUTER SYSTEMS (800) 433-5184; WELLS AMERICAN (803) 796-7800.

er is the Hercules Monochrome Graphics Card ($499). For color software you need the Hercules Color Card ($245). At least one of the compatibles, the Leading Edge Model "D," has a "Hercules-compatible" graphics adapter built in to the system. On the rest, you have to buy a board (about $150) and stick it in an expansion slot.

Q. What's an acceptable number of expansion slots?

A. Expansion slots, into which you can plug add-on circuit boards, give you the potential to add internal modems, hard-disk drives, enhanced graphics adapters, etc. In general, the more slots the better, but on some computers you don't need as many. For instance, the IBM PC has five expansion slots, but several will be taken up with a video adapter, disk drive controller card, memory beyond 256K, and a serial and/or parallel port. A multifunction card can combine several of these necessities into one slot.

On the other hand, the Leading Edge Model "D" has only four slots, but has a parallel and serial interface, two monitor adapters (color and monochrome) built in, and can expand to 640K by adding memory chips to the

LOW-COST IBM PC AND AT COMPATIBLES: $629 TO $1,995

Model	List Price	Standard Memory	Disk Drives	Clock Calendar Included	Built-In Ports (Parallel or Serial)	Monochrome Monitor[1]	Display Card(s)[2]	Software Included	Microprocessor Speed (MHz)	Expansion Slots	Warranty (months)
IBM PC COMPATIBLES											
The Diversified Group DG-PC	$848	640K	Two 360K	N	P,S	Y	c/g	PC-DOS 2.1, $80	4.77	8	12
EMI/XT	$1,995	640K	Two 360K	Y	P,S	Y	c/g	WP, database, spreadsheet, PC-DOS, $60–$80	4.77	8	6
Epson Equity I	$1,295	256K	Two 360K	Y	P,S	$149	m/g, $129 c/g, $149	BASIC, MS-DOS 2.11	4.77	3	12
Fountain Technologies Model 2	$1,100	640K	Two 360K	Y	P,S	Y	m/g	None *	4.77	8	3
Jade Computer Jade XPC	$1,295	640K	Two 360K	N	P	Y	m/g	PC-DOS 3.1	4.77	8	3
Kaypro PC	$1,595	256K	Two 360K	Y	P,S	Y	m/g c/g	BASIC, MS-DOS 2.11, Polywindow, Star series, Mite	4.77	6	3
Leading Edge Model D	$1,495	256K	Two 360K	Y	P,S	Y	m/g c/g	BASIC, MS-DOS 3.1, Leading Edge Word Processing	4.77	4	15
Magnum XT Mark 2	$995	640K	Two 360K	Y	P,2S	$159	m/g, $179	MS-DOS 2.11	4.77/8	5	3
Main Street Adept DC-88T	$699	640K	One 360K	N	—	$139	text, $99 m/g, $149	MS-DOS 3.1 with BASIC, $85	4.77/6.66	8	12
1 800 Floppys XT	$999	640K	Two 360K	N	P	Y	m/g	None *	4.77	8	4[5]
PC Designs FD-1000[4]	$1,399	1Mb	Two 360K	Y	2P, 2S	Y	m/g	None *	4.77/8	5	12
PC's Limited Turbo PC	$795	640K	One 360K	N	—	$169	m/g, $159	MS-DOS 3.1, $60	4.77/6	8	12[5]
PC USA Star	$1,295	640K	Two 360K	N	P	Y	m/g	MS-DOS 3.1	4.77/8	8	12
Sanyo MBC-885	$1,499	256K	Two 360K	Y	P	N RGB, $599	c/g, $299	BASIC, MS-DOS 2.11	4.77/8	8	12
Standard Brand PC/XT	$629	640K	One 360K	N	—	$159	m/g, $89 c/g, $99	PC-DOS 2.11, $85	4.77	8	12
Tandy 1000	$999	128K	One 360K	N	P	$149	c/g	BASIC, MS-DOS 2.11, DeskMate	4.77	3	3
Tandy 1200	$1,499	256K	Two 360K	N	P	$199	m/g, $250	BASIC, MS-DOS 2.11	4.77	7	3
TCS Turbo PC	$795	640K	One 360K	N	—	RGB, $349[3]	c/g, $119	None *	4.77/6.66	8	12
IBM AT COMPATIBLES											
AT's Wells American A Star	$1,495	512K	One 1.2Mb	Y	—	$139	m/g, $119	PC-DOS 3.1, $85	6/8	8	3[5]
Main Street Adept DC-286	$1,975	512K	One 1.2Mb	Y	—	$139	m/g, $99	MS-DOS 3.1 with BASIC, $85	8	8	12
PC Designs Turbo AT[4]	$1,995	1Mb	One 1.2Mb or 1 360K	Y	P,2S	Y	m/g	None *	8	8	12
PC's Limited AT	$1,995	1Mb	One 1.2Mb	Y	2P,2S	$169	m/g, $159 c/g, $259	PC-DOS 3.1, $85	8	8	12[5]
Standard Brand STD-AT	$1,699	640K	One 1.2Mb	Y	—	$99	m/g, $89	MS-DOS 3.1	6	8	12
TCS Turbo AT	$1,595	1Mb	One 1.2Mb	Y	—	N RGB, $349[3]	m/g, $119	None *	6/8	8	13

The computers are listed here as they are most commonly sold. All computers can be expanded with third-party monitors (monochrome or RGB) and add-on boards. Most can be bought with one floppy disk drive and one hard disk drive. All computers can be expanded to 640K; expansion to several megabytes is possible for special purposes. Some of these computers are sold by mail-order only.

FOOTNOTES:
* MS-DOS and GW-BASIC can be bought from other dealers. **1** If a monochrome monitor is included, a monochrome adapter is also included. **2** M/G = Monochrome graphics; C/G = color graphics. **3** Monochrome out of stock. **4** Kit; user installs disk drives and power supply. **5** Includes 30-day money-back guarantee.

"motherboard" without using a slot. (The motherboard is the main circuit board that lies beneath all other components and contains the chips and circuits that run the computer.)

Q. What is MS-DOS?

A. MS-DOS is the operating system for the IBM PC and compatibles. You must usually load the MS-DOS disk (it's called PC-DOS on the IBM PC) every time you turn the computer on. The disk is needed to run any commercial software.

Q. I see different versions of MS-DOS advertised. Which one should I get?

A. Many computers are equipped with a version of MS-DOS as part of the standard package. But other manufacturers sell MS-DOS separately, as IBM itself does. MS-DOS 2.1, which costs around $60, is not the latest version, but just about all PC and XT software will run under it. If you want to get an IBM AT compatible, or the computer you buy can be upgraded to one, get MS-DOS 3.1, which costs around $85.

Q. What does 4.77 MHz mean?

A. MHz is an abbreviation for megahertz, which is a unit of measurement for a computer's microprocessor speed. The IBM PC runs at 4.77 megahertz, so most of the compatibles do so as well. However, many also run at a faster speed, usually 6 MHz or 8 MHz. This faster speed comes in handy when recalculating a large spreadsheet or performing a SORT function on a database. On a word processor, the faster speed won't improve program performance. Also, the faster speed doesn't affect the disk access speed.

Q. What's the difference between an IBM PC, IBM PC XT, and IBM PC AT?

A. Both the IBM PC and XT use the Intel 8088 microprocessor, and they function identically. However, the IBM PC has five expansion slots and a 63.5 watt power supply, while the IBM XT has 8 expansion slots and a 130 watt power supply. The larger power supply is designed to run an internal hard-disk drive. Some compatibles have an even larger power supply.

The IBM PC AT uses the more powerful Intel 80286 microprocessor, runs faster than the PC or XT (6 MHz), and its disk drives store 1.2 megabytes of data.

Q. What's an AT keyboard?

A. The IBM PC keyboard has a small ENTER key, and SHIFT keys that some typists find hard to reach. As a result, it's not hard to hit the wrong key. On the IBM PC AT, IBM used a keyboard just like the one on the IBM Selectric typewriter. Some compatible manufacturers realize this improved keyboard adds value to their system, and thus include it.

Q. How come some mail-order houses sell IBM PCs for much less than dealers? Are these real IBM PCs?

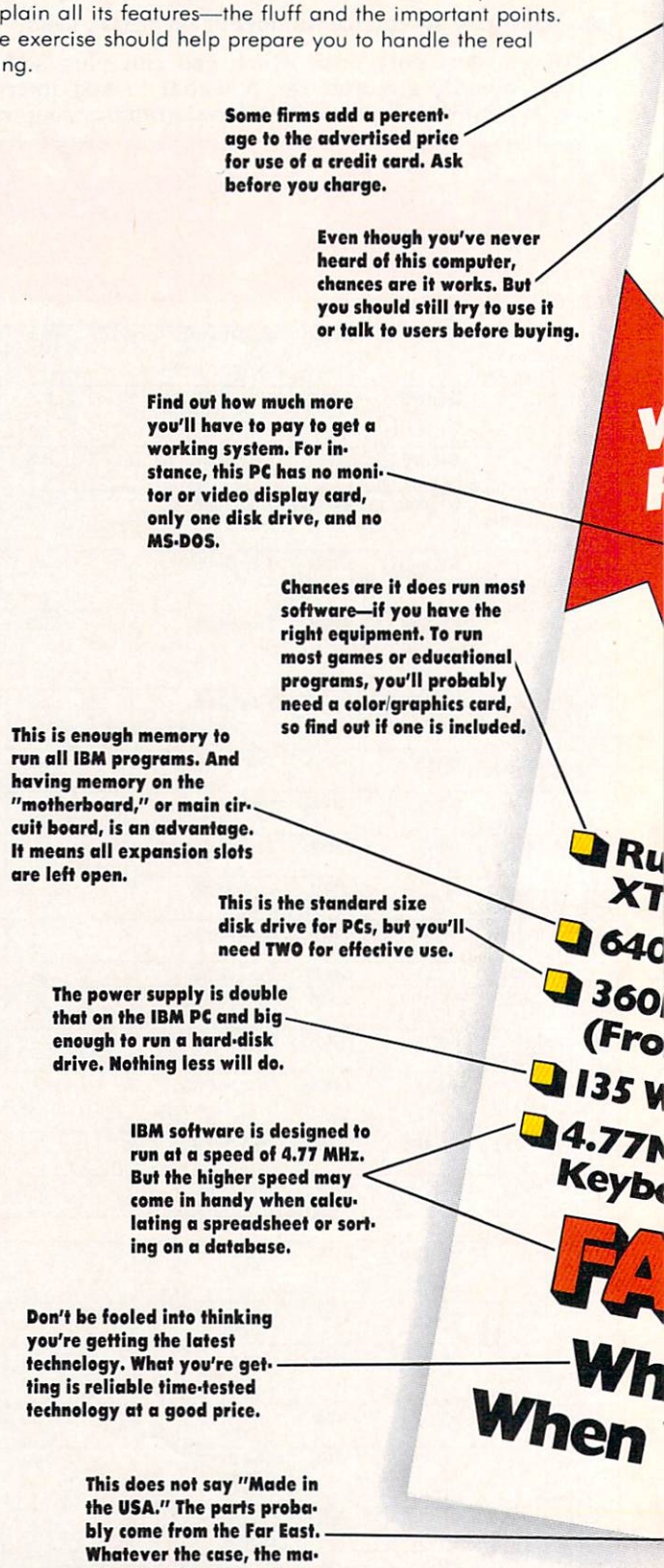
A. Yes. Many dealers, much against IBM's wishes, sell excess inventory to unauthorized mail-order houses, which sell them at discounts. This is known as the "gray market." The machines are bona fide IBM PCs, but IBM, of course, will not honor the warranty.

Q. Will prices continue to drop?

A. Yes, though there's a limit to how low they can go. IBM has recently cut prices on both the PC and XT, which will place price pressure on the compatibles. Put it this way. For $1,500 you can buy a computer system that would have cost $5,000 just two years ago. FC

HOW TO READ THE ADS

You can't fully judge a computer by looking at an ad, but you can see whether the machine advertised begins to meet your basic criteria. The ad you see here is realistic, but not real. We created the ad so we could then take it apart and explain all its features—the fluff and the important points. The exercise should help prepare you to handle the real thing.



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- Clock/Calendar
- AT Style Keyboard
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Ask how many slots will be open after adding parallel and serial ports, a disk drive controller, and a display card. Ask if the slots are short, medium or long; long cards won't fit in a short slot!

Find out if the warranty covers parts only, or labor as well; and where you have to ship the computer for repairs.

Don't be impressed; a controller is required to run the disk drive.

A c/c is a nice bonus. You always know time and date, and the device lets DOS "stamp" the correct time and date on files when you save them.

A plus, though most PC compatibles include this AT keyboard with a large L-shaped RETURN key.

Find out if there's room for an internal hard drive, or whether you have to add it outside the system unit. And don't forget you'll need a hard-disk drive controller, which costs about $200.

STER Than IBM PC or XT!

Settle For Old Technology

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EPSON EQUITY 1

A STYLISH PC FROM "THE PRINTER COMPANY"

BY HENRY F. BEECHHOLD

$1,574 for 256K, 2 disk drives, monochrome monitor, MS-DOS, BASIC

Epson, whose name is virtually synonymous with printers, has never had much success as a maker and seller of computers. But now, with its new Equity series of low-cost IBM compatibles, Epson is in the right ballpark.

The machine reviewed here is the Equity I. It looks good, offers several thoughtful features, and is reasonably priced. A two-drive, 256K system with a parallel and serial port and a monochrome monitor costs $1,574.

The higher priced Equity II is an IBM XT compatible, and the Equity III an IBM AT compatible.

LOOK

The stylish Equity I takes up about a third less desk space than the IBM PC. You pay for this compactness in the loss of expansion slots. The Equity I has only three (the Equity II has five, and the Equity III has eight), one of which is already occupied with Epson's own monochrome video board.

SEE

The 12-inch, monochrome monitor uses a long-persistence green phosphor (I prefer amber) that fades slowly when the screen changes. I'm not fond of slow-fade screens, however, as the phosphor tends to "smear." Beyond this, the display showed some blurring at the edges as well as a small degree of "keystoning"—the image area is smaller at the top than at the bottom. Fortunately, all but the periphery of the display is acceptably crisp.

FEEL

Equity's keyboard is of the AT type, with very large RETURN and SHIFT keys. There are no status lights (such as CAPS LOCK), however, and the touch lacks the definitive spring of the best keyboards. The feel isn't bad, but it isn't great.

The design of the system unit is well thought out. Below the sleek two-drive stack is a hinged cover that when opened reveals a RESET button and various switches to control system settings. Along the right side of the disk drives are two additional hinged covers. The top one hides the power switch and power-on light (visible through a small opening in the cover) and the bottom one hides the keyboard plug receptacle. This tidy arrangement looks good and subjects the cable to the least possible strain.

The disk drives have no doors. Instead, you simply slide the disk into its slot. When the disk hits the back stop, the drive latches. To release the disk, you press a spring-loaded button. It works well.

INS AND OUTS

The Equity comes with one serial port and one parallel port, both IBM compatible. Since it has a monochrome adapter, you can connect a monochrome monitor without an additional interface. But you won't be able to run color graphics software, nor will you be able to run a color monitor without adding a color/graphics board.

While your productivity "basics" (word processing, database, spreadsheet programs) will run fine without a color/graphics card, at least so far as the video display is concerned, the 256K "starter" memory will have to expand to at least 512K to run some of the bigger programs. You can expand up to 512K by adding the Epson 256K RAM expansion card in a special slot. The memory can be expanded to 640K altogether, but you'll use up one of the two open slots.

SOFTWARE

The Equity I comes with two pieces of software: MS-DOS 2.11 and GW-BASIC. In addition to the standard MS-DOS utilities (FORMAT, and so on), Epson provides a menu-driven "System Setup." A utility called XTREE puts you in touch with most DOS operations through an easy-to-use menu, so you can get started without having to learn too much about how to work MS-DOS.

GW-BASIC is virtually the same as IBM's BASICA. A program written in BASICA should run correctly in GW-BASIC, but you won't be able to run IBM BASICA itself on your Epson (or any other compatible).

The Equity I manuals are little different from all the other MS-DOS and GW-BASIC manuals. But at the back of the MS-DOS manual is a User's Guide written with the same clarity we have come to expect from Epson, the printer company. Numerous line drawings explain how to take things apart and put them back together.

OPERATION

Setup requires nothing more than plugging in the monitor and the power cord, turning on the juice, and booting up the MS-DOS disk. Loading the SETUP utility will enable you to quickly configure the system to your taste, within the limits of the hardware.

A week of day-and-night running produced no failures—not even a mild hiccup. The supplied software ran fine, as did a wide range of IBM-specific software. While my unit didn't have a color/graphics board, I wouldn't anticipate problems running color graphics software.

The Epson machine is modestly priced, and generally well built. The main problems are the screen display and the limited number of expansion slots, which limit future growth. If you want to assure more upward mobility, look at the Equity II or III.

Be that as it may, the Epson Equity I deserves a careful look, especially if you're on a fairly tight budget. You certainly won't have to worry about whether the company will be in business six months from now. FC

KAYPRO PC

ANOTHER COMPUTER-WITH-SOFTWARE FROM KAYPRO

BY HENRY F. BEECHHOLD

$1,595 for 256K, 2 disk drives, monochrome monitor, color/graphics, Star series, Mite, MS-DOS, BASIC

The IBM-compatible Kaypro PC is potentially three computers in a single box. And, like virtually all Kaypro computers since the original CP/M Kaypro II, the Kaypro PC represents good value for your money.

The basic computer ($1,595)—which I tested—is a twin-floppy, 256K RAM system. Add a hard-disk and controller card, and it becomes a more powerful system. Add Kaypro's new 286 PC Card (built around the 80286 microprocessor used in the IBM PC AT), and you have a virtual AT compatible. By designing their PC to accept this 286 PC Card ($799 w/ trade-in on 8088 chip), Kaypro keeps obsolescence at bay.

OUTSIDE STORY

The American made heavy-duty steel system unit is solid and well made. But the Kaypro PC is large and heavy, so it's certainly not for small desks or moving about.

The AT-style keyboard (made in Taiwan) includes splendidly large ENTER and SHIFT keys. A panel just north of the keypad contains status lights for CAPS LOCK, NUM LOCK, and SCROLL LOCK. But the solidity that marks the computer itself, alas, is missing from the keyboard. It's a lightweight piece—though not downright flimsy—that I found spongy to the touch.

The 12-inch green monochrome monitor (made in Korea) is sharp and easy to read, but can be annoying because the long-persistence phosphor leaves a smeary effect during display changes.

If you prefer color, you can plug in an RGB color monitor. Unlike the IBM PC and many compatibles, which come without a color/graphics adapter, the color outputs are already in place on the Kaypro. In fact, the system is set up to send color display information to the monochrome monitor. The Compaq Portable is the only other compatible that does this without an extra interface. On most systems, you need a color monitor to be able to run color software.

INSIDE STORY

In this age of memory-scarfing software, you may be comforted to know that the Kaypro's RAM can be expanded to 768K, not "merely" 640K, like so many compatibles. Moreover, you can expand to 768K by adding chips to the main circuit board, without using any of the six open expansion slots.

This abundance of expansion slots, which leaves room for future growth, is the advantage of a large-sized machine. But, without adding a single component, most users will have a full-service system. Built into the standard model are a serial port, a parallel port, a color monitor port, a monochrome port, and a clock/calendar.

SOFTWARE BONUS

Kaypro has a grand tradition of supplying free software with its computers. The new PC is no exception. *WordStar* (with *CorrectStar*, *MailMerge*, and *StarIndex*) is Kaypro's choice for your word processor. Well, why not? It's certainly well known and well tested, and helps make this a powerful word-processing system.

MS-DOS 2.11 includes all the usual DOS utilities (FORMAT, EDLIN, DEBUG, and the like) as well as some custom programs with menus that make the operating system easier to use. Also included is *Polywindows*, a multi-function pop-up program with various desk accessories such as a calendar; and, of course, old reliable GW-BASIC.

Finally, as part of the admission ticket, you get *MITE*, telecommunications software with all the bells and whistles you're likely to ever want. To use it, of course, you'll need a modem.

OPERATION

As soon as I unboxed the Kaypro, I turned it on. In a week's running, it misbehaved not once. In fact, the computer didn't even get warm; the monitor, barely so. Everything performed as advertised—with virtually full IBM compatibility. Besides the Kaypro-supplied software, I fed the PC a variety of popular software written for the IBM PC. Nearly all of it ran without incident. The only problem occurred with *Flight Simulator*, which caused the video display to roll uncontrollably. Other people, however, have not had this problem.

And, though it's not a fast "turbo" computer, Kaypro PC runs *WordStar* at a fancy clip that old-time *WordStar* users will marvel at.

HITS & MISSES

I like the fact that the system is set up to send color display information to the monochrome monitor. I also like the clean, easily accessible interior. The quiet fan is a plus. I'm glad that Kaypro appreciates the fact that a computer box can be adequately cooled without resorting to a high-velocity howler.

But why does Kaypro, like so many clone-makers, insist on plugging the keyboard connector into the back of the computer? Think of how much less stress the cable would get if it were plugged into the front panel—and how much easier it would be to move about.

All told, the Kaypro PC is a well-made, well-priced system. With the ability to turn into an AT overnight, it's a system protected against obsolescense (at least for a time). The Kaypro PC is backed by an established company with a good track record of reliability. If one thing can be said about Kaypro users, it's that they are satisfied users. What more can you ask for? FC

Games That Can Last All Summer

ENGINEER A GREAT VACATION WITH COMPUTER CONSTRUCTION SETS

BY JAMES DELSON

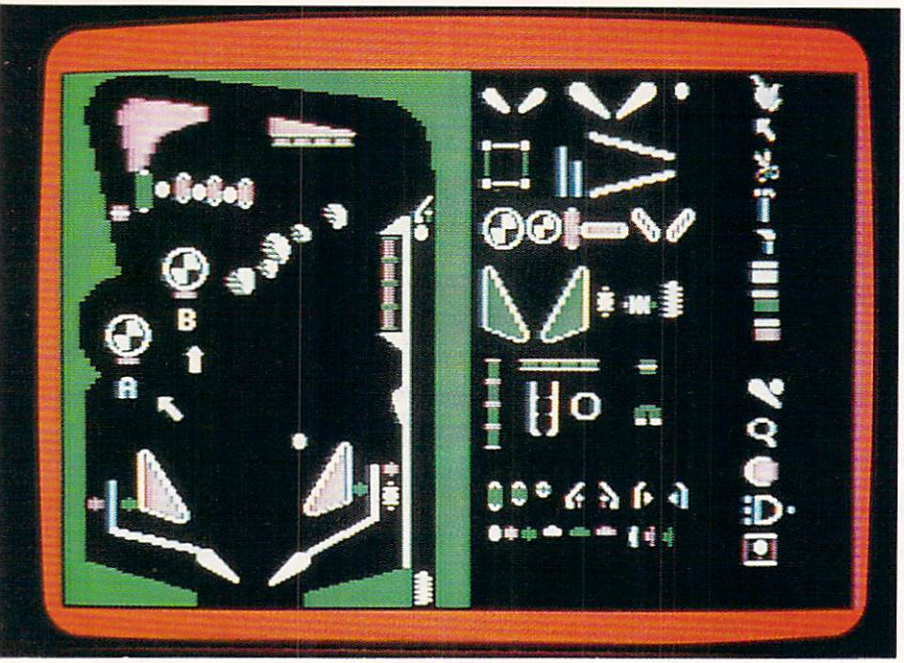


Figure 1:
When you boot up the Pinball Construction Set, *the "parts box" fills the right half of the screen, while the playing field is on the left—in this case, a pinball tabletop. Place bumpers, flippers, and other pinball parts wherever you want on the monitor's tabletop.*

What can you say about your computer? It's made of metal and plastic, has keys, a disk drive, a joystick or mouse, and assorted other contraptions that are intended to make life easier, more enjoyable, and less confusing. You can write with your computer, do your taxes, and cross-index your collection of Davy Crockett cards. And you can play games on it. No surprise, right? But some people don't realize you can also *create* amazing games with your computer.

Using a wide variety of entertainment programs called "construction sets" (also called "C-sets"), you can play games that are ready-to-use right out of the box, then modify them by changing anything from names of characters to entire sequences in adventures. Or, in the most complex construction sets, start with the computer equivalent of blank paper and design a whole game from scratch. This could take a whole, long, wonderful summer!

Making up your own games with construction sets is easier than you think. In most cases, if you can point with a joystick, you can begin construction almost as soon as the disk is booted. These sets are designed to make the creative process an enjoyable one, and there's a bonus in the sense of achievement one gets at having concocted something unique.

WHAT ARE CONSTRUCTION SETS?

Construction sets are not limited to avid gamers, nor timid ones. They are accessible to all, including people who have never played computer games. These kits on a disk include such programs as simple hand-eye coordination games (like those you've seen in coin-operated arcades), pinball construction, sports and car-racing simulations, political and role-playing adventure programs, fantasy and western shoot-'em-ups, and historical war games. There's even a game that lets you conjure up a four-masted sailing ship, make yourself captain, and steer to glory against another player or a computerized opponent.

If you envision construction programs as electronic versions of your old toy train or slot car sets, you'll be on the right track. Just as you would take out different cars—box cars, the locomotive, or the caboose, for instance—and would place different pieces of track in a pattern of your own design, the computer construction set will usually appear on your screen as a set of pieces which you arrange to create your own game.

Take a look at the starting screen for the classic *Pinball Construction Set (see Figure 1)*. On the monitor appears a basic pinball tabletop to the left, and a "parts box" to the right. The pieces available to you include a wide variety of pinball elements, such as different-sized bumpers, flippers, and ball-catchers. By maneuvering your joystick or mouse, you can "pick up" any piece, then "place" it wherever you want it on the tabletop. You continue building the table, piece by piece, until you're

As the games critic for FAMILY COMPUTING, JAMES DELSON *plays when he works.*

ready to play a game of pinball. You can also test it at any point—even before it's completed—by having a trial ball shot onto the surface to see if the game works as you want it to.

Just as you could make adjustments to the finished product once your old train track layout was complete, you can go back and alter the pinball table you created at any time. And what's more, you can change the table's color or shape; change the size, shape, and color of many of the pieces which you placed on it; or even change the effects of gravity on the ball.

WHY BUY A CONSTRUCTION SET INSTEAD OF A REGULAR GAME?

If you're wondering why you should buy a sophisticated construction set instead of a regular computer game, the answer is simple: these activity kits are far more flexible than ordinary games. By letting you create a gamut of games, the life of the program is extended. In addition, the fun of inventing new ideas and putting them into action is often as enjoyable as actually playing the game.

Take *Racing Destruction Set*, for example. This driving game combines the same type of track-building skills you might have employed in designing and laying out your old set of slot cars. But this is not just a driving test; it can also be a destruction derby if you want to play competitively. You not only have to beat your human or computer opponents across the finish line of a race, but you must try to eliminate them; force them off the track or make them blow a tire to win the game.

The track building screen *(see Figure 2)* offers you an extensive selection of track parts equipped with curves, straightaways, crossovers, and hills, as well as hairpin, "s," and banked turns.

But where a real slot car layout shows its limitations, the computerized version goes on to offer a choice of three track surfaces, bumps, jumps, and variable gravity (in case you want to simulate a race on the Moon or Jupiter). After the track is laid out, you build your own car from scratch, using a second construction set included in *Racing Destruction Set*. Choose from 10 stock vehicles such as Can-Am stock cars, street and dirt bikes, race cars, jeeps, dune buggies, moon buggies, and even VW buggies. Each can be modified for engine and tire size, speed and acceleration, and you can add such gimmicks as land mines and oil-spewing devices.

ELECT YOUR OWN PRESIDENT

Less confrontational, but equally challenging, is *President Elect*, a game which puts you in the shoes of a real or imaginary presidential candidate, any time from 1960 to 1984. Though the game comes with a number of famous candidates—from the Kennedy brothers and Richard Nixon to Ronald Reagan and Harold Stassen—you can invent an imaginary person, or insert the statistics for a real candidate who is not included in the game's roster.

To "build" your presidential candidate, fill in the appropriate answers on a questionnaire. This creates your candidate's personal philosophy, political viewpoints, and stands on the issues that are likely to arise in the game's time span—the final weeks of a given year's campaign.

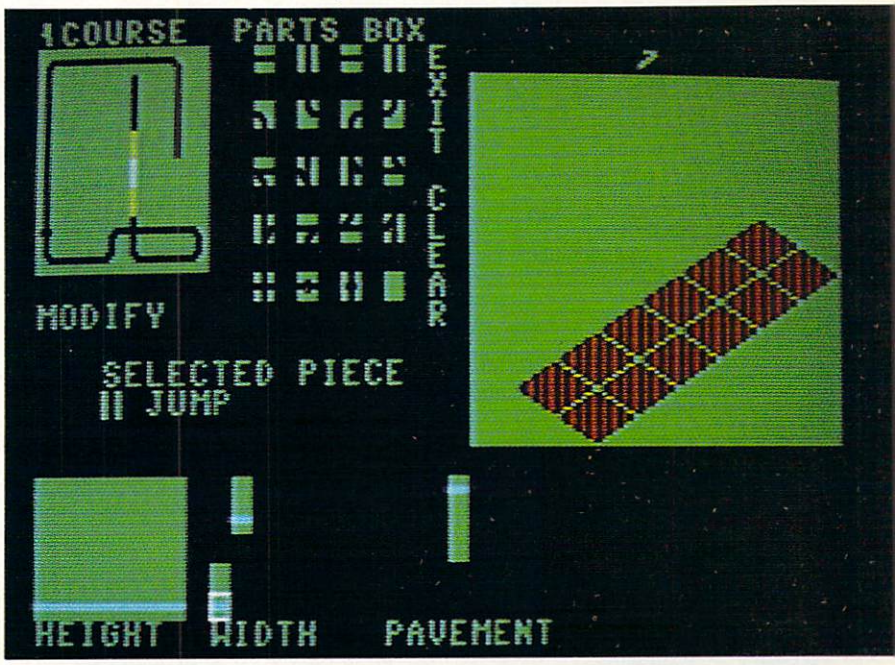


Figure 2: *With* Racing Destruction Set, *the center screen contains the "parts box" of track pieces for this simulation of slot car racing. On the left is an outline of the whole track; the square on the right is a magnified piece of track. Pieces are moved around with a joystick.*

As the game progresses, you will be called upon to answer questions using the philosophy of your candidate, and will be graded according to how closely your answers match your candidate's viewpoints. The simulation is not, however, simply a question-and-answer affair. The bulk of the program is based on how you choose to spend the contents of your campaign's war chest, allocating your funds to such areas as national, regional, and state advertising, personal appearances, and trips abroad. *President Elect* is a fascinating, exciting program, and a great way to learn.

THE STRATEGY OF MAKING A WAR

If the intricacies of the democratic process don't excite you, how about going to war with a strategy and tactics construction set? These programs, often called "war games," offer gamers the opportunity of refighting historically accurate battles or, in the case of *The Ancient Art of War* and *Under Fire!*, of inventing imaginary ones.

The easy-to-use *Ancient Art of War* is set in olden times, when archers and infantry clashed in combat, while the scenarios in *Under Fire!* take place during World War II. Both use parts-box building systems similar to the other construction sets discussed above. Pieces of terrain—from roads, hills, and forests to bridges, forts, and houses—can be placed on blank, on-screen map boards to create imaginary countrysides. Armies can then be

CONSTRUCTION SET INFORMATION

Adventure Construction Set (EA). Amiga, 64K Apple, C 64/128, IBM PC/PC*jr*. $40–$50.
The Ancient Art of War (BRO). IBM PC/PC*jr*. Macintosh. $45.
Broadsides (SSI). Apple, Atari, C 64/128. $40.
Championship Boxing (SON). 128K Apple, C 64/128, IBM PC/PC*jr*, Macintosh. $35.
Garry Kitchen's GameMaker (ACT). Apple, C 64/128. $40–$50.
Lode Runner (BRO). Apple, Atari, C 64/128, IBM PC/PC*jr*, Macintosh. $35–$40.
Mail Order Monsters (EA). C 64/128. $33.
Pinball Construction Set (EA). Apple, Atari, C 64/128, IBM PC/PC*jr*, Macintosh. $23–$40.
President Elect (SSI). Apple, C 64/128. $40.
Racing Destruction Set (EA). Atari, C 64/128. $33.
Six-Gun Shootout (SSI). Apple, Atari, C 64/128. $40.
Under Fire! (AH). Apple. $60.

COMPANY CONTACT KEY
ACT—Activision, (415) 960-9410.
AH—Avalon Hill, (301) 254-9200.
BRO—Broderbund, (415) 479-1170.
EA—Electronic Arts, (415) 571-7171.
SON—Sierra On-Line, (209) 683-6858.
SSI—Strategic Simulations, Inc., (415) 964-1353.

built to do battle on the terrain saved on disk.

Under Fire! is playable as a one- or two-person game. It has various difficulty levels, but is intended for those with some experience at war gaming. *The Ancient Art of War* is solitaire only, but novices (as well as experienced gamers) can easily enjoy it.

FANTASY FIGHTERS, THE OLD WEST, AND TALL SHIPS

Should you find war-game construction sets too structured, but you still want to make your own combat, several other shoot-em-ups are available.

Would you like to construct a creature from a catalog of monster types—Tyrannosaurus Rex, Lyonbear, amoeba, human, etc.—then equip it with weapons as simple as a sword or as sophisticated as a guided missile? Then get your hands on *Mail Order Monsters*, in which you send your would-be hero into combat against the characters of other players or against more difficult computer opponents. The construction elements allow you to upgrade each of your characters after they win their bouts until you've built a stable of superheroes.

For a series of western shoot-outs based on famous movies, there's *Six-Gun Shootout*. In this movie fan's dream, you control your favorite western heroes in fights against the bad guys in pictures like *Rio Bravo*, *Gunfight at the O.K. Corral*, and *The Magnificent Seven*. The construction element of the game allows you to change the weapons your heroes employ, or even build your own simulations of the shootouts in real or made-up movies. You could, for instance, create a Clint Eastwood character from *A Fistful of Dollars* and have him go up against Gary Cooper in *High Noon*.

Broadsides delivers ship-to-ship combat simulation in the great age of sail (circa 1800). You are offered the chance to use one of the many ships included in the program, or build one yourself—from a fast little cutter all the way up to a gigantic ship-of-the-line. Going to a combat board, you sail using the wind for power. You can exchange fire with another human-controlled ship or the highly trained computer admiral. There are two levels of play, allowing beginners to enjoy the game as much as advanced players.

AND IN THIS CORNER, WEIGHING AS MANY POUNDS AS YOU DECIDE . . .

Armed combat too much for you? How about boxing or hunting for treasure? *Championship Boxing* invites you to construct your own prize fighters and match them against the computer's champs or take on other human-controlled boxers. Or in *Lode Runner*, you move a fast little character through an ever more difficult series of mazes, gathering riches while fending off endless guards and avoiding traps. The construction element in Lode Runner lets you build your own mazes once you've wound your way through the 50 mazes provided. These two C-sets are ideal for children, as they encourage creativity but don't demand a great deal of expertise to operate.

CONSTRUCTION SETS FOR EXPERTS

For those among you who want a great challenge, or whose kids have exhausted the potential in the games they've mastered, we present the two most complex construction sets available—*Garry Kitchen's GameMaker* and *Adventure Construction Set*.

These programs have been written to provide fledgling game designers with all the materials needed to create fully realized arcade or adventure games. Although each has a wide array of elements from which to assemble simulations (like the construction sets already described), they both allow the resourceful user to literally start from square one to create every image, pixel by pixel. The user then goes on to set up the story, characters, puzzles, and all the other elements which combine to make computer games.

GameMaker (*see review in this issue's "Software Reviews" section*) is meant for constructing arcade games in which hand-eye coordination is paramount. *Adventure Construction Set*, as the name implies, lets you build role-playing adventures along the lines of the *Ultima* or *Temple of Apshai* series. Both packages are difficult to use, requiring some knowledge of programming or a great deal of devotion on the part of the user to learn the intricate ins and outs of these complex C-sets.

Without question, these are games which can last at least all summer. You can expect to spend hundreds of hours on these two programs, as contrasted to the lesser amount of time required for most of the other construction kits. But there is a payoff in pride and experience that can be gained: Those taking the time to finish one or more games using *GameMaker* or *Adventure Construction Set* will have something to savor long after the summer is gone.

HOW TO PLAY A GAME THAT NO ONE ELSE HAS EVER PLAYED

The construction set form gives you an experience your other game software can rarely match. C-sets are fun to use and pay off in many ways, from the obvious (the games included in these programs are among the best you're ever likely to play) to more personal reasons (you may get a real kick out of making and playing a unique game). Each of the construction sets can be played in groups, too, which is ideal for those long summer evenings when the reruns on television aren't particularly tempting, or on rainy afternoons when you want to stay indoors. But the bottom line is that C-sets make you think and interact with people and your computer to create something tangible that can be enjoyed for a long time to come. FC

Make Your Computer One of the Team

USE WORD PROCESSING, DATA-BASE, OR SPREADSHEET SOFTWARE TO MANAGE A SPORTS TEAM

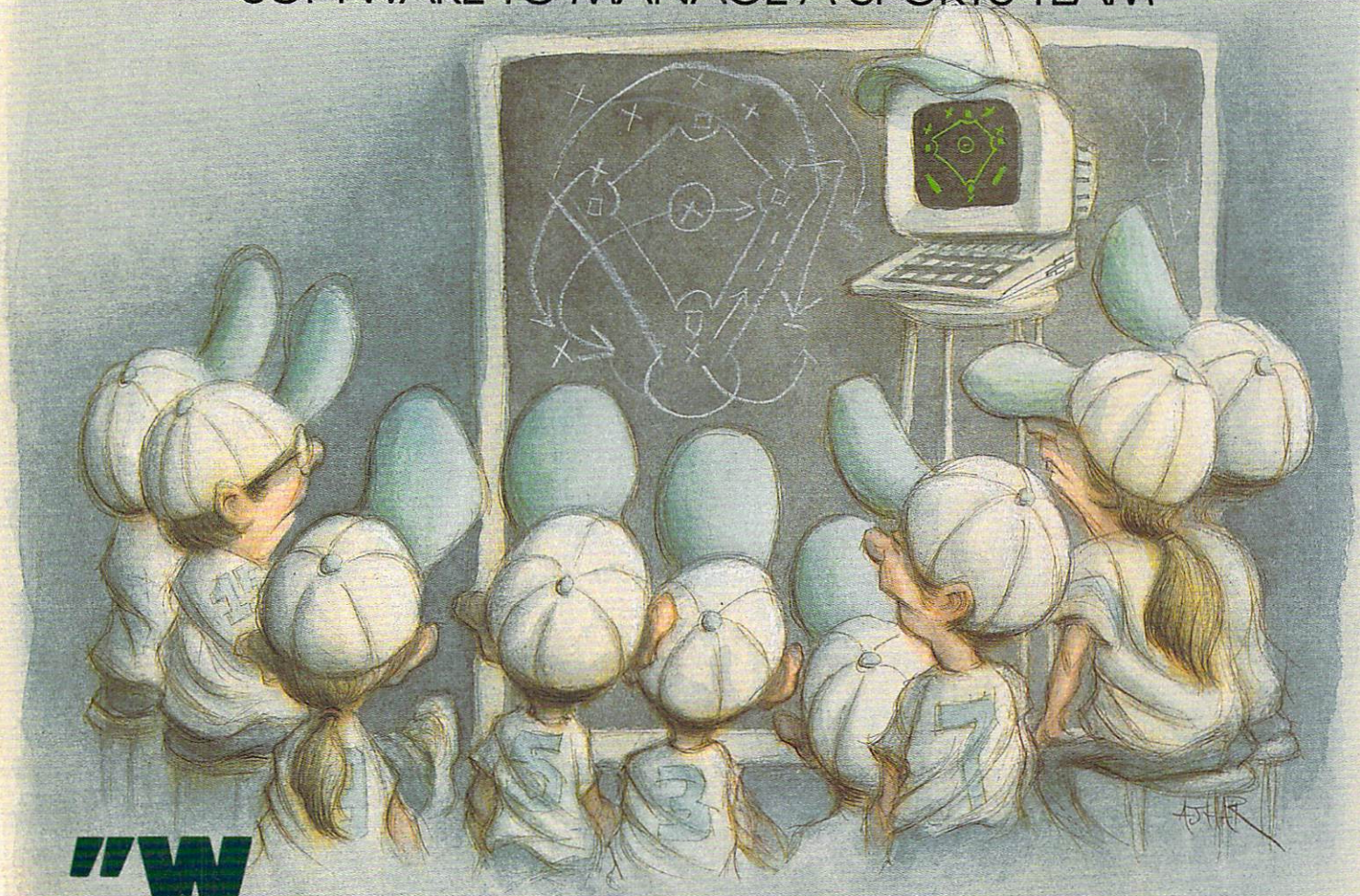


ILLUSTRATION BY BRIAN AJHAR

BY LORENE HANLEY DUQUIN

"When I signed up the boys for soccer today, the little league application had a section asking the parents to volunteer for something," my husband Dick began.

"Oh, no," I groaned. The boys were already involved in baseball and swimming, and Dick was coaching baseball and bowling. Between car pools, practices, and competitions, where would we ever find time to volunteer for one more thing?

"I volunteered our computer," continued Dick, "for the newsletter committee."

I sighed with relief. It's not the first time our computer has become part of a team: Our Apple IIe processes paperwork for a little league baseball team; it computes averages for a bowling league; it keeps statistics on swimming events; it even handles press releases for the sports section of the local newspaper.

These are the kinds of volunteer activities that I don't mind. Why? Because they don't require our physical presence at meetings or practices. We can work on these projects when we feel like it—even if it's at midnight. And best of all, because the computer is involved, the kids are always willing to help.

You can volunteer *your* computer to help manage a sports team, too, as long as you have word processing, data-base, or spreadsheet software (or, better yet, all three). If you're involved in your children's sports activities, here's how computers can save you time (and save your sanity!).

INSTANT REPLAYS OF YOUR PAPERWORK

The first year Dick began coaching little league baseball, he spent a lot of time designing forms and writing announcements and schedules. But he had to design them just once. With the computer, he was able to save the information on a disk, and now it takes only minutes every season to update the information and organize new teams. Here are some of the things you can do faster and easier with the help of your computer.

LORENE HANLEY DUQUIN *wrote "April Fools! I'd Like You to Meet My Computer" in the April issue of* FAMILY COMPUTING.

Dick Duquin (top left) teams up with his computer to coach a baseball team. His son, Chris, is kneeling on the far right.

• **Publish a newsletter.** Because of the computer, Dick's soccer newsletter, which announces team happenings, future games, etc., takes less than an hour of our time each month. The boys even help with the typing of information into the computer.

• **Write standardized letters to parents.** As a team coach, you have to write countless letters to parents. Every year, Dick gives each parent a letter explaining his philosophy of coaching and how he or she can help. Throughout the season, you can send other letters and announcements to parents about play-offs, award banquets, etc.

• **Send uniform and equipment information.** Parents also get a memo from Dick providing information about baseball uniforms and equipment—such as regulation colors, prices of jerseys, and recommended equipment.

• **Draw up team rules.** How about using a word processor to develop, alter, or reprint team rules? Every year, Dick sends parents and team members a list of the team's rules and league regulations, which rarely change.

• **Prepare team rosters.** Dick puts players' names, the parents' names, addresses, and phone numbers onto our *AppleWorks* data base to generate team rosters for the parents so they can form car pools. He also prints out a telephone tree so messages about last-minute schedule changes or game cancellations can be relayed quickly from family to family. If you have this information on a data base, you can also, for whatever purpose, generate lists of players by a criterion, such as by zip code, by place on the telephone tree, or by alphabetical order.

• **Develop schedules.** You can use a word processor to list the date, time, and place for each team practice and each game. Using *The Print Shop* with *The Print Shop Companion* (Broderbund), Dick types scheduling information into the calendar feature, and the computer prints out the information in a monthly calendar format with each event in the appropriate date box.

• **Write press releases.** Getting your winning team into the local papers is a lot easier if you have a standard form for press releases and can just fill in the blanks. We have a simple press release format that includes categories such as: who, what, when, and where.

SPLIT-SECOND CALCULATIONS

A great advantage of involving your computer in sports is the computer's ability to calculate and track. Here are some examples of how your computer can handle sports calculations:

• **Track times.** Our 10-year-old son, Chris, is a member of the local swim team and uses our spreadsheet program to keep track of his

SPORTS-TEAM MANAGEMENT SOFTWARE

Keeping sports statistics on your computer will be a real snap if you can find commercial software geared for your particular sport. Here are some programs we uncovered:

BASEBALL AND SOFTBALL

The Baseball Database
128K Apple, $50; C 64/128, $40.
Collects, stores, and reports your team's baseball statistics. Tracks up to 30 players per team and an unlimited number of teams. Menu-driven, allows for printout. (Jacobsen Software Designs, 1590 E. 43rd Ave., Eugene, OR 97405; [503] 343-8030.)

StatsMaster I
64K Apple, IBM PC/PCjr, $52.
Tracks up to 40 players on each team baseball roster and up to 40 teams in any four-league configuration. Menu-driven, allows for printout. (TNA Software, 1266 White Oaks Drive, Suite 101, Campbell, CA 95008; [408] 395-5055.)

StatsMaster Utilities
128K Apple, IBM PC/PCjr, $22.
For use with *StatsMaster I*, this utility package gives you team standings, combined team batting and pitching stats, and individual league leaders. (TNA Software; *see above for address and phone.*)

Diamond
64K, 128K Apple, $70.
Tracks and stores 28 offensive baseball and softball statistics, seven defensive statistics, and 26 pitching statistics for up to 30 players. Data-base management for team schedules, player information, equipment lists, carpool assignments, and more. Menu-driven, allows for printout. (Consistent Software Inc., 1050 Duncan Ave., Suite G, Manhattan Beach, CA 90266; [213] 374-2304.)

BASKETBALL

Assistant Coach: Basketball
48K Apple, $40.
Calculates summaries of games and performances by individual players and by teams. Also sorts by selected criteria. (Word Associates, 3096 Summit Ave., Highland Park, IL 60035; [312] 433-3076.)

BOWLING

Bowl-Keeper II
48K Apple, $50.
Calculates individual and league bowling statistics, including handicaps. Handles up to 100 bowlers for up to 36 weeks. Menu-driven, allows for printout. (Clayton & Associates, Inc., P.O. Box 6361, Clearwater, FL 33518; [813] 797-7815.)

Bowl-Keeper II Standing Sheet
48K Apple, $40.
Accommodates up to 50 teams and 100 bowlers and generates league-standing sheet using the data from *Bowl-Keeper II*. (Clayton & Associates; *see above for address and phone.*)

GYMNASTICS

Quick Gymnastics Scoring
IBM PC/PCjr, $102.
A data-management program for scoring girls' gymnastic meets. Accommodates up to 100 entrants for all events, from beginner to elite. Menu-driven. (QGS, P.O. Box 326 Dumfries, VA 22026.)

—KAREN KANE

swimming times. After each meet, he enters his times for freestyle, backstroke, breast stroke, and butterfly. The computer calculates how much his time improves from meet to meet.

- **Calculate individual statistics.** With Dick's help, our 8-year-old son, Tommy, keeps track of his batting averages on a computer spreadsheet. He enters the number of times he was up to bat, the number of hits he had, the number of walks, and the number of times he struck out. The computer then calculates his batting average and his on-base average. (*See "How to Set up a Statistical Spreadsheet," right.*)
- **Keep team stats.** Dick also keeps the same baseball statistics for every player on the team. In addition, he's designed a spreadsheet for logging the number of times players have made it to first, second, third, and home, the number of runs they've had all season, and the number of runs they've batted in. As a coach, these statistics can help you determine a batting order: You can have the computer sort the players according to the most hits, the most home runs, the most runs batted in, etc. If necessary, you can also keep the standings of every team in the league on one spreadsheet.
- **Calculate everything.** Our computer has been unanimously elected secretary of Dick's bowling league. Using a bowling program, the computer will make lane assignments, calculate averages and handicaps, rank teams, and print out individualized score sheets. (*See accompanying list of software.*) Dick, a bowling coach at the local high school, also uses a bowling program to calculate the averages of bowlers on the school teams. By keeping statistics on your bowling team, you can sort your team members by average when figuring a lineup.
- **Show each player's improvement.** At the beginning of each season, Dick has a series of drills which test each player's skill level in throwing, catching, running, batting, etc. He's designed a special worksheet so the coaches can record each player's performance. The tests are based on 10 tries, and the results are converted to percentages. (For example, Jason was able to catch a pop fly eight times out of 10, or 80 percent of the time.) The information is then entered onto a special evaluation form on the computer. During the middle of the season, Dick can run each player through the drills again, and then print out evaluations showing the parents how their child has improved in each area.
- **Tally scores.** In soccer, we've designed a spreadsheet so the kids can keep track of their goals and assists. Whenever Chris is in the goalie's position, he keeps track of the number of saves he's made. If you'd like, you can track statistics for each team member.
- **Keep tabs on equipment and uniforms.** How many bats and bases does the league own and where are they? For ordering uniforms, you can enter each player's size on your data base and let the computer tell you how many of each you'll need.
- **Prepare budgets.** If you're in charge of the team budget, your computer can be an invaluable team player. With an electronic spreadsheet, preparing budgets and handling league finances (including income and expenses) couldn't be easier.

WINNING USES ON THE SIDELINES

I don't play any sports. But I'm the one who keeps the team lists, makes the phone calls, and sees to it that everyone gets to where they're supposed to be—on time! The only way I can keep track of everything is with the computer.

When the kids first come home with their team lists, I have them enter the information on a disk. No more searching for lost rosters when we have to call another parent. If I'm part of the team telephone tree, the information on whom I have to call goes on the disk, too.

When Dick and the boys come home with practice and game schedules, I use the calendar program to enter the dates and generate a monthly calendar of sports events, which is then displayed on our refrigerator. And as for car pooling, I can arrange a schedule with the other parents and print out a calendar format detailing who drives when for each family.

I can even use the computer to make a list of all the things we've volunteered our computer to do!

The next time someone asks you to volunteer your time for the little league, consider volunteering your computer instead. There's no better person for the job! FC

I'M THE ONE WHO KEEPS THE TEAM LISTS, MAKES THE PHONE CALLS, AND SEES TO IT THAT EVERYONE GETS TO WHERE THEY'RE SUPPOSED TO BE—ON TIME! THE ONLY WAY I CAN KEEP TRACK OF EVERYTHING IS WITH THE COMPUTER.

HOW TO SET UP A STATISTICAL SPREADSHEET

When I joined the swimming team, my Dad and I set up a spreadsheet so I could keep track of my swimming times. The spreadsheet looks like this:

```
File: chris swimming            REVIEW/ADD/CHANGE              Escape: Main Menu
======A====B=======C=======D======E======F======G======H======I======J===
  1 CHRIS DUQUIN SWIMMING PERFORMANCE
  2
  3                                  50 FREE       50 BACK       50 BREAST
  4  DATE PLACE OPPONENT    TIME    FINI   TIME     FIN   TIME     FIN   TIME
  5 11/9 E.A.  LEAGUE      48.36      56  54.88      47  72.72      40
  6 12/7 CHEEKTOWAGA       43.02       4  57.26       4
  7 1/4  LANCASTER
  8 1/18 WMS   EAST AUR.    40.7       3   51.1       3
  9 2/1  ELMA               40.08      3                  61.8       4
 10 2/15 WMS   SWMC         38.88      3  51.13       4
 11
 12
 13
 14
 15
 16
 17
 18
--------------------------------------------------------------------------------
A1: (Label) CHRIS

Type entry or use @ commands                                    @-? for Help
```

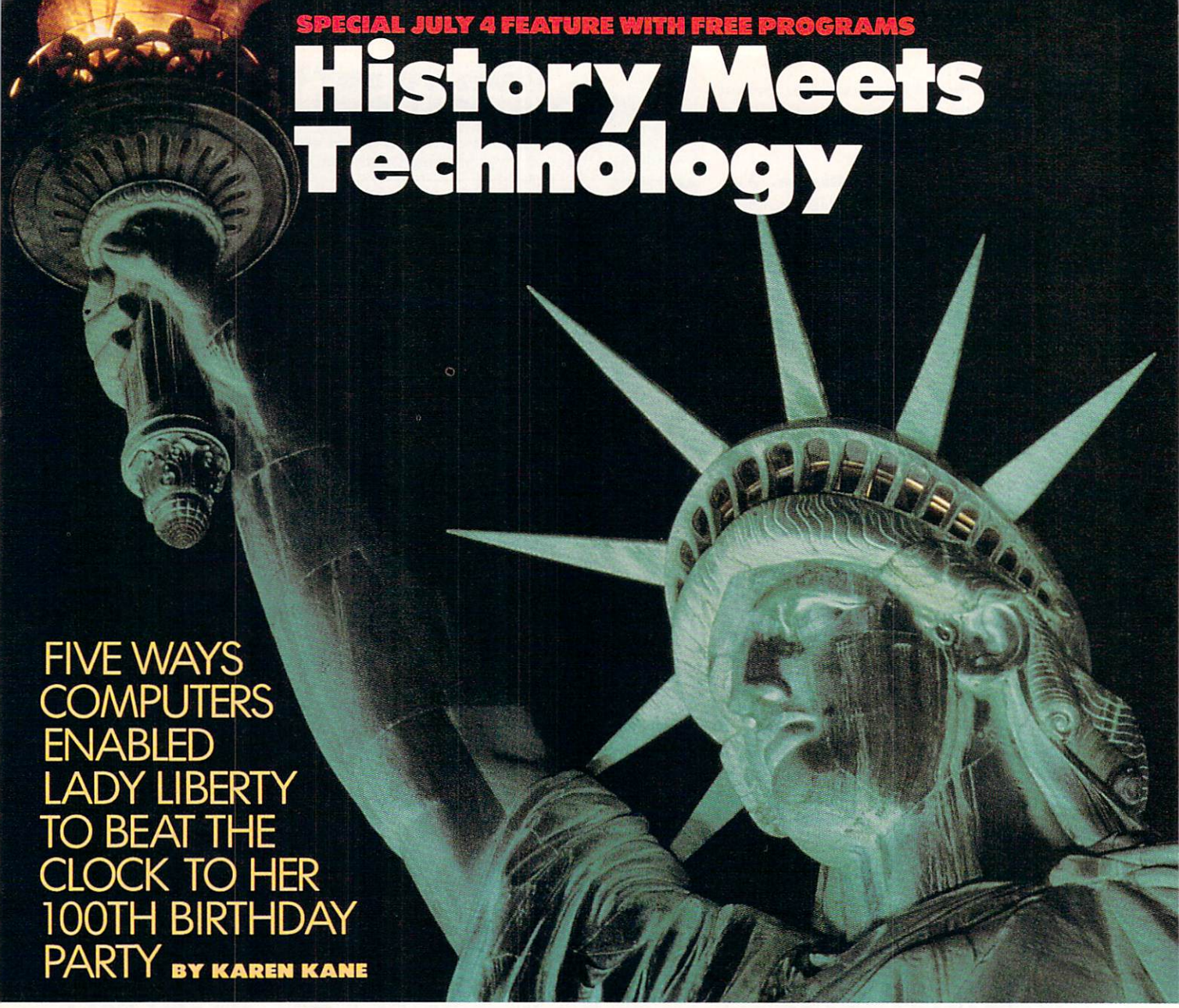
If you'd like to start a spreadsheet on your computer, determine what information you'd like to keep track of. For example, if you're a hockey lineman, you might want to keep track of shots on goal. If you're a quarterback, you could keep track of completed passes. If you play basketball, you could keep track of how many points you score for each game.

If you know how to set up a spreadsheet, enter your headings. I had to ask my Dad for help. (*See this month's Home-School Connection on page 8 for help in using spreadsheets.*) But once it's finished, it's fun to see after each game or meet how much you've improved. And it makes you want to work a little harder the next time.

—CHRISTOPHER DUQUIN

SPECIAL JULY 4 FEATURE WITH FREE PROGRAMS

History Meets Technology



FIVE WAYS COMPUTERS ENABLED LADY LIBERTY TO BEAT THE CLOCK TO HER 100TH BIRTHDAY PARTY

BY KAREN KANE

July Fourth: an immovable date for the Statue of Liberty's 100th anniversary celebrations. And thanks to the aid of computers, repairs on the weathered surface and weakened structure of the Statue of Liberty will be completed in time for this summer's festivities in New York City. Computers have played a vital role in pushing, prodding, and propelling the project forward, from the all-important fundraising, through design and project organization, to keeping special events on track during the opening-weekend crush. You can even use computers at an exhibit near the statue to view photographs of American families (perhaps your own!) and learn their histories. Organizers expect around 2 million people to visit the statue each year.

"God was with us," said Peter Zabriskie, Director of Planning and Systems for the Statue of Liberty-Ellis Island Foundation. Zabriskie, whose Ukrainian and Russian grandparents passed through Ellis Island in the early 1900's, closely monitored the schedules he created, along with other project planners, architects and engineers, on IBM PCs, as every inch of the national symbol that took 21 years to construct in the 19th century was restored, from base to torch, in just a fraction of that time.

COMPUTER-SLEUTHING STRESS POINTS

Computers played a central role from the project's beginning five years ago, when the French engineering firm CETIM began a detailed structural analysis of the statue's existing condition. To calculate the effects of wind on the aging structure, engineers placed an anemometer at the highest point on the torch to measure wind velocity, and installed stress gauges throughout the armature. These instruments were connected to a computer, creating an international on-line link between the statue and the firm's engineers in Boston and Paris.

This approach—using classical mechanical stress analysis in tandem with advanced computer applications—parallels the method used by Alexandre Gustave Eiffel, the designer of

PHOTOGRAPH BY NICK CERULLI 1986 SOL-EIF, INC.

KAREN KANE *is* FAMILY COMPUTING*'s researcher.*

the Eiffel Tower and Liberty's original support structure. Eiffel combined ancient metalwork techniques (*repoussé*) with the most advanced metal framework architecture of *his* time.

As Pierre Provoyeur, curator of the museums of France said when describing the method used by Eiffel: "It was a typically French solution, marrying the best of the past with the best of the present. The classical *repoussé* method, in existence since Roman times, was wed to the world's most advanced engineering technology."

When planning the next step, reconstruction of the badly damaged torch and flame, it was important that craftsmen remained faithful to the original design of the statue's sculptor, Auguste Bartholdi. Again computers were put to the task. Using sophisticated scanning devices, Liberty's analysts were able to generate three-dimensional, digitized drawings of the torch.

PLOTTING THE DESIGN

Next, coordinating architects Swanke Hayden Connell of New York entered the framework of the statue on their computer-aided design development (CADD) system, and generated a computer drawing by keying detailed measurements and dimensions into their Calcomp graphics system. According to Bradley Meade, associate principal architect for the firm: "Different elements of the structure were color-coded to render a clear computer representation of the statue's base, central pylon, structural planes, and connecting parts. This computerized drawing helped show the geometrical relationships among the elements of the statue and helped us build a detailed physical model."

PLANNING WITH PCS

To help juggle what had become a mind-boggling array of details, planners at the Statue of Liberty-Ellis Island Foundation sat down at their eight IBM PCs to break the project up into departments, including fundraising, restoration, and celebration. Following a divide-and-conquer principle, each of these departments were in turn divided up into manageable jobs and assigned schedules and budgets.

Having just four years to raise the $265 million needed for the restoration, the Statue of Liberty-Ellis Island Foundation went on-line with Dialog and Epsalom information services to search for potential donors. Over 3,000 names and addresses were compiled and entered into *RBASE 5000*, a database program from Microrim. A customized *RBASE* teamed with *Multimate*'s mailmerge feature, and a Canon laser printer helped produce thousands of letters, invitations, and tickets to fundraising events; mailing labels took shape on an Epson FX-100. "With the flexibility of computers, we could control the formats for mailings right from the office," said Zabriskie.

As donations came in, planners used spreadsheets like Lotus *1-2-3* to keep track of dollars and contributors from each of five geographic fundraising regions. One program, *CalcIT* (Martin Marietta), gave planners a useful three-dimensional capability that allowed them to set up a separate spreadsheet page for each region, then consolidate the pages for comprehensive totals. If one phase of construction went over budget, funds could be allocated to it from another phase with a surplus.

MONITORING THE PROGRESS

Another computer program became an invaluable tool by creating an overall planning model for the restoration work. With the *Primavera Project Planner* (Primavera Systems) and IBM PCs, each job (scaffolding assembly, skin repair and cleaning, sprinkler systems installation, etc.) was put on a time line divided into months from January 1984 to July 1986. Variables in the job schedules were then manipulated to determine, for example, whether double shifts should be set up to speed the completion of a phase, and how much the effort would cost.

A working schedule was established, daily progress was recorded, and adjustments were made when deadlines weren't met. "At one point," said Zabriskie, "fabrication and installation of the metal stairs was a bit behind schedule. *Primavera Project Planner* helped us reorganize the allocation of resources to pull this phase of the restoration out of its critical position."

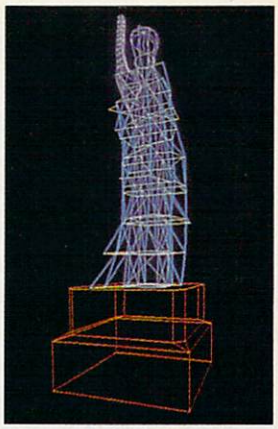
To keep close tabs on progress, the planning office used a program called *Remote* (Microstuf) and Hayes modems to communicate with computers at the restoration offices. At any time, they could read the latest developments entered on the hard disks at locations throughout the city. This strict monitoring, made simple with the help of computers, was crucial to ensure that the statue would be ready for the celebrations.

KEEPING TRACK OF THE FESTIVITIES

Even the "Liberty Weekend" celebrations will be monitored by personal computers. A new program, *The Finest Hour* (Primavera Systems) will detail every planned activity by the hour so that schedules can be quickly updated as necessary.

At one of the special exhibits, "America's Family Album," visitors will be able to search a database of family photographs stored on video discs and accessed by IBM PC XT's. The system will allow users to cross-check photo files by family name, country of origin, and year of arrival in the United States. This information will appear on a color monitor along with the photograph.

The Statue of Liberty's reconstruction was an enormous undertaking that required not only the skill of diligent craftsmen, but the kind of precision design, timing and organization that only advanced technology can offer.



PHOTOGRAPH COURTESY SWANKE HAYDEN CONNELL ARCHITECTS

COMPUTE YOUR ROOTS

If you're interested in researching your ancestry, here is a short list of genealogical software that will help you store and organize your family data. For more information on how to contribute photos and family background to the "America's Family Album" exhibit, contact your local photo dealer or write to "America's Family Album," P.O. Box 23195, Rochester, New York 14692.

Family Roots. For 64K Apple, C 64/128, IBM PC/PC*jr*, and Tandy Model IV, $185. (Quinsept, Inc., P.O. Box 216, Lexington, MA 02173; [617] 641-2930.)

Roots II. For IBM PC/PC*jr*, $195. (Commsoft, Inc., 2257 Old Middlefield Way, Mountain View, CA 94043; [415] 967-1900.)

The Genealogist's Right Hand. For 48K Apple, $50. (User Friendly Systems, Inc., 6135 Ross Rd., Fairfield, OH 45014; [513] 874-4550.)

PORTRAIT OF LIBERTY

BY JOHN JAINSCHIGG

In honor of the Glorious Fourth and the unveiling of the newly refurbished Statue of Liberty, here's *Portrait of Liberty*—a patriotic program you can type in that really gives your computer's sound and/or graphics capabilities a workout. Part 1 of *Portrait of Liberty* plays a stirring arrangement of the "Star Spangled Banner." Part two draws a detailed portrait of the statue on your computer's screen. Just follow the tips and instructions below and program up some real computer fireworks for our country's birthday!

INSTRUCTIONS

If you're an old hand at typing in BASIC programs, go right to the instructions, below. If you're a newcomer, welcome aboard! Read the tips *(opposite)* to make your first program-typing experience a rewarding one.

If you just want to hear "The Star Spangled Banner," type in the listing for your computer, omitting the lines printed in red.

If you want to see the Statue's portrait, too, type in the entire listing, including the lines printed in red, and add the data lines on page 50.

Apple II series/*Portrait of Liberty*

Note to Apple owners: The graphics data for Portrait of Liberty *is included in lines 1000-1420, below. Omit these lines, along with lines 10-70, if you just want to hear the "Star Spangled Banner."*

```
10 HOME:HGR2:HCOLOR= 3
20 READ A,B
30 FOR I = 1 TO 200
40 READ C,D:IF C = 0 THEN READ A,B:GOTO 70
50 HPLOT A*.7,B*.7 TO C*.7,D*.7
60 A = C:B = D
70 NEXT I
80 DIM V(102,2)
90 FOR I = 0 TO 28:READ A:POKE 768+I,A:NEXT I
100 FOR I = 1 TO 102:READ V(I,1),V(I,2):NEXT I
110 FOR I = 1 TO 102
120 POKE 6,V(I,2)*20:POKE 8,V(I,1)
130 CALL 768:NEXT I:GOTO 110
1000 DATA 116,172,138,205,151,244,194,253,210,249
1010 DATA 230,218,239,199,228,209,221,212,200,213
1020 DATA 186,207,173,193,165,169,165,155,174,155
1030 DATA 176,151,184,151,184,149,187,148,188,151
1040 DATA 191,151,191,149,194,149,199,155,199,164
1050 DATA 194,178,197,182,205,184,208,184,219,181
1060 DATA 216,178,212,178,210,179,206,178,203,179
1070 DATA 203,165,204,148,200,142,193,141,176,141
1080 DATA 168,144,166,140,175,132,184,130,204,118
1090 DATA 215,127,239,135,245,139,253,153,254,160
1100 DATA 260,166,263,166,264,168,263,170,260,170
1110 DATA 257,174,252,180,251,185,247,189,253,202
1120 DATA 247,236,253,235,253,250,262,255,300,255
1130 DATA 290,232,292,228,288,226,281,191,279,182
1140 DATA 268,158,273,153,263,134,263,120,266,113
1150 DATA 328,112,272,99,272,96,349,85,266,85
1160 DATA 255,78,313,25,233,67,215,64,204,21
1170 DATA 194,65,174,67,94,26,153,76,152,78
1180 DATA 142,85,59,85,136,96,136,99,78,113
1190 DATA 141,113,148,122,136,154,116,172,0,0
1200 DATA 82,112,137,106,136,97,0,0,63,86
1210 DATA 138,90,142,86,0,0,96,26,168,73
1220 DATA 165,80,173,78,180,66,0,0,214,64
1230 DATA 199,73,226,76,244,81,244,70,312,26
1240 DATA 0,0,256,80,256,88,267,97,269,89
1250 DATA 347,84,0,0,271,96,271,105,328,112
1260 DATA 0,0,266,150,259,132,255,112,265,103
1270 DATA 261,99,250,107,246,104,252,91,247,89
1280 DATA 239,102,231,100,235,86,228,83,225,98
1290 DATA 214,97,214,82,208,82,208,97,199,98
1300 DATA 199,83,193,83,194,97,183,97,178,84
1310 DATA 173,86,176,99,168,102,159,88,155,91
1320 DATA 162,105,168,106,182,102,162,112,156,121
1330 DATA 161,126,175,127,187,122,197,116,205,110
1340 DATA 224,126,238,131,248,133,253,134,257,140
1350 DATA 261,146,263,152,266,151,0,0,217,149
1360 DATA 217,147,220,143,229,142,237,143,242,149
1370 DATA 240,151,236,151,234,149,231,149,234,149
1380 DATA 231,149,228,150,226,149,224,149,224,151
1390 DATA 218,149,0,0,153,211,157,184,160,184
1400 DATA 160,213,153,212,0,0,192,193,202,188
1410 DATA 206,190,210,188,220,193,0,0,192,193,200,197
1420 DATA 212,197
2000 DATA 165,8,74,133,10,164,8,173,48,192,136,234
2010 DATA 234,208,251,165,7,56,229,10,133,7,176,237
2020 DATA 198,6,208,233,96
3000 DATA 162,3,193,1,243,4,193,4,162,4,121,8
3010 DATA 96,3,108,1,121,4,193,4,173,4,162,8
3020 DATA 162,2,162,2,96,6,108,2,121,4,128,8
3030 DATA 144,3,128,1,121,4,121,4,162,4,193,4,243,4
3040 DATA 162,3,193,1,243,4,193,4,162,4,121,8
3050 DATA 96,3,108,1,121,4,193,4,173,4,162,8
3060 DATA 162,2,162,2,96,6,108,2,121,4,128,8
3070 DATA 144,3,128,1,121,4,121,4,162,4,193,4,243,4
3080 DATA 96,3,96,1,96,4,91,4,81,4,81,8
3090 DATA 92,2,96,2,108,4,96,4,91,4,91,8
3100 DATA 91,4,96,6,108,2,121,4,128,8,144,3,128,1
3110 DATA 121,4,193,4,173,4,162,8,162,4
3120 DATA 121,4,121,4,121,2,128,2,144,4,144,4,144,4
3130 DATA 108,2,96,2,91,2,96,2,108,2,121,2,121,4,128,4
3140 DATA 162,2,162,2,121,6,108,2,96,2,91,2,81,8
3150 DATA 121,2,108,2,96,4,91,4,108,4,121,8
```

Atari 400/800, 600/800XL, & 130XE/*Portrait of Liberty*

```
10 DIM S$(6000),S1$(6000)
20 GRAPHICS 8+16:SETCOLOR 2,11,15:SETCOLOR 1,0,0
30 COLOR 1:READ A,B:PLOT A*0.8,B*0.7
40 FOR I=1 TO 216
50 READ C,D
60 IF C=0 THEN READ A,B:PLOT A*0.8,B*0.7:GOTO 90
70 DRAWTO C*0.8,D*0.7
80 A=C:B=D
90 NEXT I
100 X=120:Y=100:GOSUB 3000
110 X=183:Y=102:GOSUB 3000
120 X=173:Y=133:GOSUB 3000
130 DIM V1(102,2),V2(95,2)
140 FOR I=1 TO 102:READ A,B:V1(I,1)=A:V1(I,2)=B:NEXT I
150 FOR I=1 TO 95:READ A,B:V2(I,1)=A:V2(I,2)=B:NEXT I
160 P1=1:P2=1:T1=0:T2=0
170 SOUND 1,V1(P1,1),10,8
180 SOUND 2,V2(P2,1),10,8
190 FOR DE=1 TO 20:NEXT DE
200 T1=T1+1
210 IF T1=V1(P1,2) THEN T1=0:P1=P1+1:SOUND 1,0,0,0
220 T2=T2+1
230 IF T2=V2(P2,2) THEN T2=0:P2=P2+1
240 IF P1<>103 THEN 170
250 GOTO 160
3000 SP=1
3010 LOCATE X,Y,C
3020 IF C=0 THEN 3050
3030 SP=SP-1:IF SP=0 THEN RETURN
3040 GOSUB 4000
3050 PLOT X,Y
3060 LOCATE X,Y-1,C
3070 IF C=0 THEN Q=X:R=Y-1:GOSUB 5000
3080 LOCATE X,Y+1,C
3090 IF C=0 THEN Q=X:R=Y+1:GOSUB 5000
3100 LOCATE X+1,Y,C
3110 IF C=0 THEN Q=X+1:R=Y:GOSUB 5000
3120 LOCATE X-1,Y,C
```

KEYS TO TYPING IN PROGRAMS

Before typing in a program . . .

1. Check to see if it will run on your computer under a version of BASIC you have available (the program heading will tell you what kind of BASIC and what special equipment, if any, the program requires).

2. If you have a disk drive, prepare a disk for saving the program once you're finished typing. Your Disk Operating System or disk drive manual will tell you how.

3. Get your version of BASIC fired up and ready. Read the introductory chapters of your BASIC manual carefully.

While typing, keep in mind that . . .

1. BASIC programs consist of "lines," each beginning with a line number (Macintosh BASIC "lines" don't need line numbers), containing letters, numbers, and punctuation marks of various kinds. Each "line" may be composed of several "statements"—instructions that tell the computer to perform various actions—and may continue over several physical lines on the page and/or on your screen.

When typing in a BASIC program, forget considerations of format and get the *content* of what you type to match the *content* of what you see on the printed page. Regardless of how margins may break up a program "line," it hasn't ended until you reach another line number or the end of the program listing. Begin typing with the line number, then continue on, typing every letter, number, space, and punctuation mark in the order it appears, ignoring margins. Where the "line" ends, there will usually be some trailing spaces (which you don't have to type in), followed by the next line number at the left margin of the listing. At this point, all you have to do is press the RETURN or ENTER key to register the "line" in memory, then continue with the next "line."

2. All marks in a program listing—including every letter, number, space, and punctuation mark—*mean* something to your computer. Moreover, even symbols that look very similar to you mean completely different things to the machine. For example, it is important to distinguish between "1" (number one) and "l" (small letter "L"), or "O" (capital letter "O") and "0" (digit zero). Note that zeros are slashed in most program listings to facilitate discrimination.

It's important, therefore, to duplicate every line exactly when typing. Otherwise you can't expect the program to work as it should, or even work at all. Even upper- and lower-case is important on certain computers; the words "PRINT" and "print" may mean completely different things.

3. Each computer has its own commands and keys for program "editing," and your user's manual will tell you how to use them. Besides the editing keys, there are two sure-fire ways of correcting errors in a BASIC program line. If you're just typing along and make a mistake, press the DELETE key (the back arrow key on most systems) to rub out the offending character, and then continue typing. Once you've pressed RETURN or ENTER to register the line, mistakes are a little harder to fix. You must use the editing keys or type the line in again from the beginning (including the line number) and press RETURN or ENTER. The new line will replace the old one with the same line number in your computer's memory. This option is a little more work, but foolproof.

4. Periodically, during the course of a typing session, in between typing sessions, and always before attempting to run any program you've typed in, make sure to save the program on a disk or cassette. Until you do so, there's no permanent record of your work. Saving a program is usually as easy as typing SAVE "filename" (substitute a one-word name of your choice between the quotes), and pressing RETURN or ENTER. Check your manual for more precise instructions. Each computer system has its own quirks, and it's important to get things like program saving right the first time.

After you've finished . . .

1. Just type "RUN" and press RETURN or ENTER. If you've typed everything in correctly, the program should work as described.

2. Of course, it almost never does. Not even for seasoned programmers. Typing in a program and having it run right off the bat qualifies as a small miracle. Usually there are one or more mistakes, major or minor, that have slipped past your careful scrutiny, and are causing your computer to do unexpected things. Not to worry. Now comes what some people consider the most enjoyable part of the programming process: a procedure called "debugging"—finding and eliminating your mistakes. To review portions of your program on the computer screen, use the LIST command as explained in your BASIC manual. If you have a printer, you might find it more convenient to print out what you've typed (check your manual for the appropriate command). Look over each section of the program carefully, preferably with someone else's help. Make sure you haven't dropped a line or a character, miscounted spaces between a pair of quotes, mistaken a comma for a period, mixed up an "O" and a zero, or (most likely) all of the above. When you find a mistake, retype the offending line from the original listing, including the line number, and press RETURN or ENTER as explained above.

Naturally, mistakes tend to occur more frequently in certain areas of a program than in others. Complicated equations are easy to foul up by dropping or mismatching parentheses or math symbols. Data statements—program lines beginning with the usual number, followed by the word "DATA"—are another popular trouble spot. Check them carefully. And, of course, remember to SAVE a copy of the corrected program when you're finished.

Good luck!

```
3130 IF C=0 THEN Q=X-1:R=Y:GOSUB 5000
3140 GOTO 3010
4000 X=ASC(S$(SP))+59:Y=ASC(S1$(SP)):RETURN
5000 S$(SP)=CHR$(Q-59):S1$(SP)=CHR$(R):SP=SP+1:RETURN
6000 DATA 162,3,193,1,243,4,193,4,162,4,121,8,96,3,108
6010 DATA 1,121,4,193,4,173,4,162,8,162,2,162,2,96,6
6020 DATA 108,2,121,4,128,8,144,3,128,1,121,4,121,4
6030 DATA 162,4,193,4,243,4,162,3,193,1,243,4,193,4
6040 DATA 162,4,121,8,96,3,108,1,121,4,193,4,173,4,162
6050 DATA 8,162,2,162,2,96,6,108,2,121,4,128,8,144,3
6060 DATA 128,1,121,4,121,4,162,4,193,4,243,4,96,3,96
6070 DATA 1,96,4,91,4,81,4,81,8,92,2,96,2,108,4,96,4
6080 DATA 91,4,91,8,91,4,96,6,108,2,121,4,128,8,144,3
6090 DATA 128,1,121,4,193,4,173,4,162,8,162,4,243,4
6100 DATA 243,4,243,2,128,2,144,4,144,4,144,4
6110 DATA 108,2,96,2,91,2,96,2,108,2,121,2,121,4,128,4
6120 DATA 162,2,162,2,121,6,108,2,96,2,91,2,81,8,121,2
6130 DATA 108,2,96,4,91,4,108,4,121,8,0,16,144,8,153,3
6140 DATA 153,1,144,4,121,4,121,4,128,8,162,2
6150 DATA 162,2,121,6,128,2,144,4,162,8,162,2,162,2
6160 DATA 121,4,121,4,128,4,121,4,121,4,0,16,144,8,153
6170 DATA 3,153,1,144,4,121,4,121,4,128,8,162,2,162,2
6180 DATA 121,6,128,2,144,4,162,8,162,2,162,2,121,4
6190 DATA 121,4,128,4,121,4,121,4,0,16,243,4,193,4,173
```

```
6200 DATA 4,162,8,0,4,162,4,144,4,128,4,121,6,128,2
6210 DATA 144,2,173,2,162,8,182,3,162,1,193,4,144,4
6220 DATA 108,4,81,2,72,2,81,2,91,2,96,2,108,2,121,4
6230 DATA 121,4,96,2,121,2,91,4,96,4,114,4,108,2,144,2
6240 DATA 217,2,193,2,182,2,217,2,162,4,162,4,162,2
6250 DATA 162,2,121,6,128,2,121,2,108,2,96,8,91,2,108
6260 DATA 2,121,4,108,4,128,4,243,8
```

Commodore 64 & 128 (C 64 mode)/*Portrait of Liberty*

```
10 MA=8192:SC=1024:PRINT CHR$(147)
20 FOR I=0 TO 20:READ J:POKE 49152+I,J:NEXT I
30 POKE 251,0:POKE 252,32:POKE 53272,PEEK(53272) OR 8
40 POKE 53265,PEEK(53265) OR 32:SYS 49152
50 FOR I=SC TO SC+999:POKE I,22:NEXT I:POKE 53280,2
60 READ A,B:X=A:Y=B:GOSUB 3000:FOR I=1 TO 216:READ C,D
70 IF C=0 THEN READ A,B:X=A:Y=B:GOSUB 3000:GOTO 160
80 X=A:Y=B:GOSUB 3000
90 F=0:V1=ABS(C-A):V2=ABS(D-B):S1=SGN(C-A):S2=SGN(D-B)
100 IF X=C AND Y=D THEN 150
110 F1=F+V1:F2=F-V2
120 IF ABS(F1)>=ABS(F2) THEN F=F2:X=X+S1:GOTO 140
130 F=F1:Y=Y+S2
140 GOSUB 3000:GOTO 100
150 A=C:B=D
160 NEXT I
170 DIM V1%(102,3):S=54272
180 FOR I=0 TO 24:POKE S+I,0:NEXT I
190 POKE S+5,28:POKE S+6,192
200 POKE S+24,15:X1=S+4:FOR I=1 TO 102
210 READ V1%(I,1),V1%(I,2),V1%(I,3):NEXT I
220 P1=1:T1=0
230 POKE S+1,V1%(P1,1):POKE S,V1%(P1,2)
240 POKE X1,33
250 FOR D=1 TO 35:NEXT D:T1=T1+1
260 IF T1=V1%(P1,3) THEN T1=0:P1=P1+1:POKE X1,32
270 IF P1=103 THEN 220
280 GOTO 230
```

```
980 DATA 169,0,170,168,145,251,200,240,2,208,249
990 DATA 230,252,232,224,32,240,2,208,240,96
3000 RO=INT(Y*0.7/8):CH=INT(X*0.8/8):LI=Y*0.7 AND 7
3010 BI=7-(X*0.8 AND 7):BY=MA+RO*320+CH*8+LI
3020 POKE BY,PEEK(BY) OR 2^BI:RETURN
4000 DATA 12,143,3,10,143,1,8,97,4,10,143,4
4010 DATA 12,143,4,16,195,8,21,31,3,18,209,1
4020 DATA 16,195,4,10,143,4,11,218,4,12,143
4030 DATA 8,12,143,2,12,143,2,21,31,6,18,209
4040 DATA 2,16,195,4,15,210,8,14,24,3,15,210
4050 DATA 1,16,195,4,16,195,4,12,143,4,10
4060 DATA 143,4,8,97,4,12,143,3,10,143,1,8
4070 DATA 97,4,10,143,4,12,143,4,16,195,8,21
4080 DATA 31,3,18,209,1,16,195,4,10,143,4,11
4090 DATA 218,4,12,143,8,12,143,2,12,143,2
4100 DATA 21,31,6,18,209,2,16,195,4,15,210
4110 DATA 8,14,24,3,15,210,1,16,195,4,16,195
4120 DATA 4,12,143,4,10,143,4,8,97,4,21,31
4130 DATA 3,21,31,1,21,31,4,22,96,4,25,30,4
4140 DATA 25,30,8,22,96,2,21,31,2,18,209,4,21,31
4150 DATA 4,22,96,4,22,96,8,22,96,4,21,31,6
4160 DATA 18,209,2,16,195,4,15,210,8,14,24
4170 DATA 3,15,210,1,16,195,4,10,143,4,11
4180 DATA 218,4,12,143,8,12,143,4,16,195,4,16
4190 DATA 195,4,16,195,2,15,210,2,14,24,4,14,24
4200 DATA 4,14,24,4,18,209,2,21,31,2,22,96
4210 DATA 2,21,31,2,18,209,2,16,195,2,16,195
4220 DATA 4,15,210,4,12,143,2,12,143,2,16
4230 DATA 195,6,18,209,2,21,31,2,22,96,2,25
4240 DATA 30,8,16,195,2,18,209,2,21,31,4,22
4250 DATA 96,4,18,209,4,16,195,8
```

IBM PC & compatibles/*Portrait of Liberty*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter, w/Advanced BASIC A2.00. The Monochrome/Printer card is sufficient if only the music portion of the program is typed in.

```
10 SCREEN 1:KEY OFF:CLS:COLOR 7,0
20 READ A,B:FOR I=1 TO 216
```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```
30 READ C,D:IF C=0 THEN READ A,B:GOTO 60
40 LINE(A*.8,B*.7)-(C*.8,D*.7),1
50 A=C:B=D
60 NEXT I
70 PAINT(120,100),1
80 PAINT(183,102),1
90 PAINT(173,133),1
100 DIM A$(15)
110 FOR I=1 TO 15:READ A$(I):NEXT I
120 FOR I=1 TO 15
130 PLAY A$(I)
140 NEXT I:GOTO 120
2000 DATA t230l4o2g.e8l2ceg>l1c
2010 DATA l4e.d8l2c<ef#l1g
2020 DATA l4ggl2>e.d4c<l1b
2030 DATA l4a.b8>l2cc<gec
2040 DATA l4o2g.e8l2ceg>l1c
2050 DATA l4e.d8l2c<ef#l1g
2060 DATA l4ggl2>e.d4c<l1b
2070 DATA l4a.b8>l2cc<gec
2080 DATA l4>e.e8l2efgl1g
2090 DATA l4fel2defl1f
2100 DATA l2fe.d4c<b1l4a.b8
2110 DATA >l2c<ef#l1gl2g
2120 DATA >ccl4c<bl2aaa>l4defedcl2c<b
2130 DATA l4ggl2>c.l4defl1g
2140 DATA l4cdl2efdl1c
```

IBM PC*jr* & compatibles/*Portrait of Liberty*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PCjr w/Cartridge BASIC J1.00, Tandy 1000 w/GW-BASIC 2.02 version 00.05.00 or 01.01.00.

```
10 SCREEN 1,0:KEY OFF:CLS:COLOR 7,0
20 READ A,B:FOR I=1 TO 216
30 READ C,D:IF C=0 THEN READ A,B:GOTO 60
40 LINE(A*.8,B*.7)-(C*.8,D*.7),1
50 A=C:B=D
60 NEXT I
70 PAINT(120,100),1
80 PAINT(183,102),1
90 PAINT(173,133),1
100 SOUND ON:BEEP OFF
110 DIM A$(15),B$(15),C$(15)
120 FOR I=1 TO 15:READ A$(I):NEXT I
130 FOR I=1 TO 15:READ B$(I):NEXT I
140 FOR I=1 TO 15:READ C$(I):NEXT I
150 FOR I=1 TO 15
160 PLAY A$(I),B$(I),C$(I)
170 IF PLAY(N)>5 THEN 170
180 NEXT I:GOTO 150
2000 DATA t230l4o2g.e8l2ceg>l1c
2010 DATA l4e.d8l2c<ef#l1g
2020 DATA l4ggl2>e.d4c<l1b
2030 DATA l4a.b8>l2cc<gec
2040 DATA l4o2g.e8l2ceg>l1c
2050 DATA l4e.d8l2c<ef#l1g
2060 DATA l4ggl2>e.d4c<l1b
2070 DATA l4a.b8>l2cc<gec
2080 DATA l4>e.e8l2efgl1g
2090 DATA l4fel2defl1f
2100 DATA l2fe.d4c<b1l4a.b8
2110 DATA >l2c<ef#l1gl2g
2120 DATA >ccl4c<bl2aaa>l4defedcl2c<b
2130 DATA l4ggl2>c.l4defl1g
2140 DATA l4cdl2efdl1c
3000 DATA t230o2p1p1l1a
3010 DATA l4<g#.g#8l2a>ccl1<b
3020 DATA l4ggl2>c.<b4al1g
3030 DATA l4ggl2>cc<b>cc
3040 DATA o2p1p1l1a
3050 DATA l4<g#.g#8l2a>ccl1<b
3060 DATA l4ggl2>c.<b4al1g
3070 DATA l4ggl2>cc<b>cc
3080 DATA <p1p1l2ce
3090 DATA f#l1gp2l2ga
3100 DATA b>c.l4<baf#l1gl4f.g8
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3120 DATA l2ccl4ecl2ffc#l4d<a>defdl2gg
3130 DATA l4ggl2c.l4<b>cdl1e
3140 DATA l4fdl2cd<b>l1c
4000 DATA t230o2p1l2c<bl1a
4010 DATA l4<b.b8>l2>c<a>dl1d
4020 DATA l4ggl2>c.<l4gef#l1g
4030 DATA l4f.g8l2eefec
4040 DATA o2p1l2c<bl1a
4050 DATA l4<b.b8>l2>c<a>dl1d
4060 DATA l4ggl2>c.<l4gef#l1g
4070 DATA l4f.g8l2eefec
4080 DATA l4c.c8l2cdel1e
4090 DATA l4dc<l2b>cdl1d
4100 DATA l2dc.l4gef#g1l4f.d8
4110 DATA l2eddl1gl2g
4120 DATA eel4gel2ffel4agagaal2gg
4130 DATA l4gfl2e.l4dcdl1e
4140 DATA l4ag#l2gagl1e
```

Tandy Color Computer w/Extended Color BASIC/*Portrait of Liberty*

```
10 PMODE 4:SCREEN 1,0:PCLS
20 READ A,B
30 FOR I=1 TO 216
40 READ C,D:IF C=0 THEN READ A,B:GOTO 70
50 LINE(A*.8-30,B*.7)-(C*.8-30,D*.7),PSET
60 A=C:B=D
70 NEXT I
80 PAINT(90,100)
90 PAINT(153,102)
100 PAINT(143,133)
110 DIM A$(15)
120 FOR I=1 TO 15:READ A$(I):NEXT I
130 FOR I=1 TO 15
140 PLAY A$(I)
150 NEXT I:GOTO 130
2000 DATA T5L302GL8EL2CEG03L1C
2010 DATA L3EL8DL2C02EF#L1G
2020 DATA L4GGL103EL4DC02L1B
2030 DATA L3AL8B03L2CC02GEC
2040 DATA L302GL8EL2CEG03L1C
2050 DATA L3EL8DL2C02EF#L1G
2060 DATA L4GGL103EL4DC02L1B
2070 DATA L3AL8B03L2CC02GEC
2080 DATA L303EL8EL2EFGL1G
2090 DATA L4FEL2DEFL1F
2100 DATA L2FL1EL4DC02L1BL3AL8B
2110 DATA 03L2C02EF#L1GL2G
2120 DATA 03CCL4C02BL2AAA03L4DEFEDCL2C02B
2130 DATA L4GGL203CL4CDEFL1G
2140 DATA L4CDL2EFDL1C
```

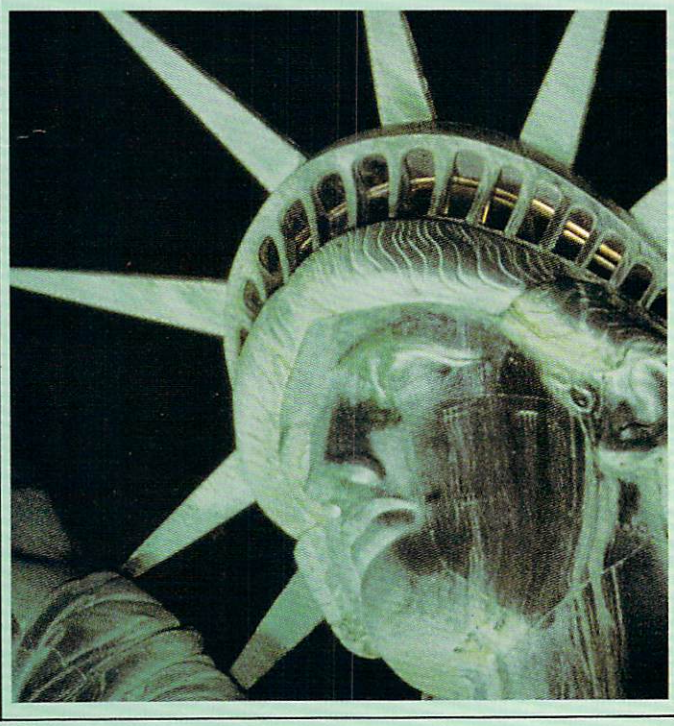
Tandy Models III & 4 (Model III mode)/*Portrait of Liberty*

Note to Tandy Models III & 4 (Model III mode) owners: Since these models have no sound capabilities, we can only offer the graphic portion of Portrait of Liberty. *To see the portrait, enter the lines below, as well as the data lines at the end of this section.*

```
10 CLS:READ A,B
20 FOR I=1 TO 216
30 READ C,D:IF C=0 THEN READ A,B:GOTO 140
40 X=INT(A*.4)-20:Y=INT(B*.2)-4
50 X1=INT(C*.4)-20:Y1=INT(D*.2)-4
60 SET(X,Y)
70 F=0:XV=SGN(X1-X):YV=SGN(Y1-Y)
80 XQ=ABS(X1-X):YQ=ABS(Y1-Y)
90 IF X=X1 AND Y=Y1 THEN 130
100 F1=F+XQ:F2=F-YQ
110 IF ABS(F1)>=ABS(F2) THEN F=F2:X=X+XV
ELSE F=F1:Y=Y+YV
120 SET(X,Y):GOTO 90
130 A=C:B=D
140 NEXT I
150 GOTO 150
```

Graphics Data/*Portrait of Liberty*

```
1000 DATA 116,172,138,205,151,244,194,253,210,249
1010 DATA 230,218,239,199,228,209,221,212,200,213
1020 DATA 186,207,173,193,165,169,165,155,174,155
1030 DATA 176,151,184,151,184,149,187,148,188,151
1040 DATA 191,151,191,149,194,149,199,155,199,164
1050 DATA 194,178,197,182,205,184,208,184,219,181
1060 DATA 216,178,212,178,210,179,206,178,203,179
1070 DATA 203,165,204,148,200,142,193,141,176,141
1080 DATA 168,144,166,140,175,132,184,130,204,118
1090 DATA 215,127,239,135,245,139,253,153,254,160
1100 DATA 260,166,263,166,264,168,263,170,260,170
1110 DATA 257,174,252,180,251,185,247,189,253,202
1120 DATA 247,236,253,235,253,250,262,255,300,255
1130 DATA 290,232,292,228,288,226,281,191,279,182
1140 DATA 268,158,273,153,263,134,263,120,266,113
1150 DATA 328,112,272,99,272,96,349,85,266,85
1160 DATA 255,78,313,25,233,67,215,64,204,21
1170 DATA 194,65,174,67,94,26,153,76,152,78
1180 DATA 142,85,59,85,136,96,136,99,78,113
1190 DATA 141,113,148,122,136,154,116,172,0,0
1200 DATA 82,112,137,106,136,97,0,0,63,86
1210 DATA 138,90,142,86,0,0,96,26,168,73
1220 DATA 165,80,173,78,180,66,0,0,214,64
1230 DATA 199,73,226,76,244,81,244,70,312,26
1240 DATA 0,0,256,80,256,88,267,97,269,89
1250 DATA 347,84,0,0,271,96,271,105,328,112
1260 DATA 0,0,266,150,259,132,255,112,265,103
1270 DATA 261,99,250,107,246,104,252,91,247,89
1280 DATA 239,102,231,100,235,86,228,83,225,98
1290 DATA 214,97,214,82,208,82,208,97,199,98
1300 DATA 199,83,193,83,194,97,183,97,178,84
1310 DATA 173,86,176,99,168,102,159,88,155,91
1320 DATA 162,105,168,106,182,102,162,112,156,121
1330 DATA 161,126,175,127,187,122,197,116,205,110
1340 DATA 224,126,238,131,248,133,253,134,257,140
1350 DATA 261,146,263,152,266,151,0,0,217,149
1360 DATA 217,147,220,143,229,142,237,143,242,149
1370 DATA 240,151,236,151,234,149,231,149,234,149
1380 DATA 231,149,228,150,226,149,224,149,224,151
1390 DATA 218,149,0,0,153,211,157,184,160,184
1400 DATA 160,213,153,212,0,0,188,191,190,191
1410 DATA 201,187,205,187,211,189,212,187,219,188
1420 DATA 227,192,219,192,214,191,211,192,207,192
1430 DATA 205,191,199,191,197,193,199,196,215,197
1440 DATA 210,200,207,200,203,199,199,200,194,196
1450 DATA 189,192,189,191
```



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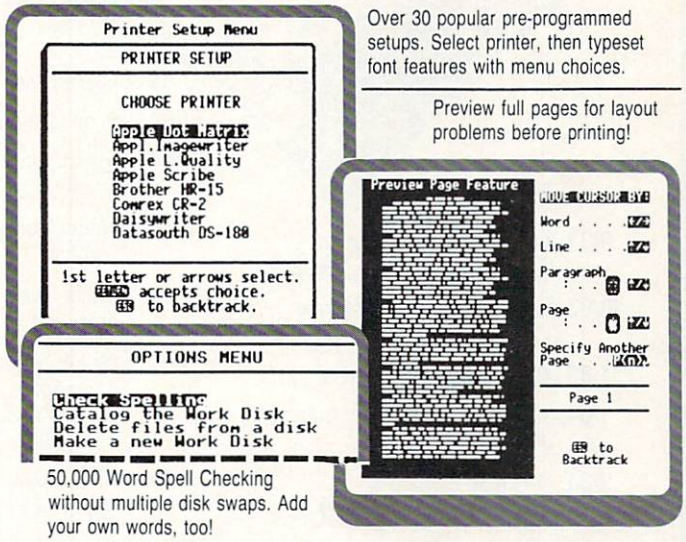

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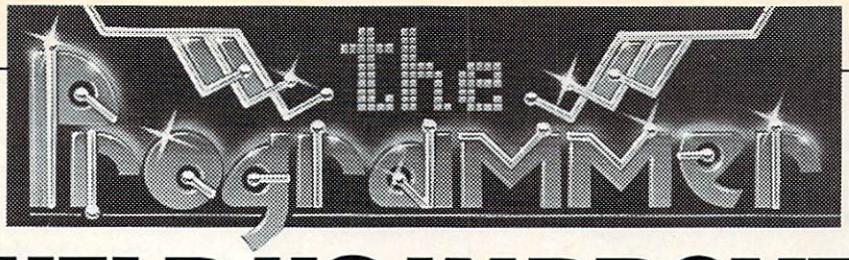

HELP US IMPROVE THE PROGRAMMER . . .

AND GET A CHANCE TO WIN FREE DISKS!

Each month in The Programmer, we try to bring you a variety of programs to suit every taste. Now we'd like you to tell us how we're doing and what kind of programs *you'd* like to see in the future.

This month, our programs appear as parts of other articles, ranging from *Portrait of Liberty* on page 46 through *Mortgage Renegotiation Analysis* on page 14 to Microtones in K-Power (page 53).

Twenty-five of the people who respond to this survey, chosen at random, will each win a box of 10 Memorex floppy disks. But to be eligible for the disk giveaway, your questionnaire must be received at FAMILY COMPUTING by August 15, 1986. So why not get out a pen or pencil right now and fill it out?

Then pull out this page (or photocopy both sides), fold it in thirds, and mail in a stamped, business-sized envelope to the address on the reverse side. We'll use the survey results to improve The Programmer, and we'll try to bring you more of the kinds of programs you like the most.

TELL US ABOUT YOURSELF

1. Your name: _____

Your age: _____
Male ☐ Female ☐

2. How many other family members type in or use FAMILY COMPUTING programs? ____

3. How often do you see FAMILY COMPUTING?
☐ Subscribe ☐ Buy frequently ☐ Buy occasionally ☐ Share someone else's copy when I can

TELL US ABOUT YOUR SYSTEM

4. What kind of computer(s) do you have in your home? Specify brand and model, please.

_____

_____

5. Do you plan to purchase a computer within the next twelve months?
☐ Yes ☐ No
If yes, which are you considering? _____

_____

6. How much memory (RAM) does your most heavily used computer have? ____

7. What peripherals do you own?
☐ Monochrome monitor ☐ Color monitor
☐ Disk drive (how many? ____)
☐ Hard-disk drive
☐ Printer: Brand (e.g., Epson) _____
Model (e.g., FX-80) _____
☐ Plotter ☐ Modem
☐ Cassette recorder for computer
☐ Joystick(s) ☐ Mouse ☐ Touch tablet
☐ Speech synthesizer or recognizer
☐ Music peripheral
☐ Other (specify:) _____

_____

TELL US ABOUT TYPING IN OUR PROGRAMS

8. How many FAMILY COMPUTING programs have you typed into your computer?
☐ None ☐ One or two ☐ Several
☐ About one a month ☐ More than one a month

9. Do you type in programs from (check all that apply) . . .
☐ The Programmer? ☐ Microtones?
☐ Compucopia? ☐ Articles outside The Programmer? ☐ Amazing Games or other subscription bonus books?
☐ Other magazines: (which ones?) _____

_____

_____

10. On the average, how long does it take you to type in a program? _____
To get it working once you've typed it in? _____

11. Do other members of your family help you type in or proofread programs, or do you generally handle the whole task yourself?
☐ Others help ☐ All on my own

12. Have you ever read Tips to the Typist? ☐ Yes ☐ No
If so, was it helpful? ☐ Yes ☐ No

13. If a program you've typed in doesn't run, do you . . .
☐ assume the program is incorrect?
☐ assume you've made a typing error?
☐ wait for the next issue to check for Programming P.S.?
☐ write or call FAMILY COMPUTING?
☐ give up?

14. Of the programs you've typed in, how many did you eventually get running? ☐ All ☐ Most ☐ Some
☐ None

15. If you've had particular problems with any of FAMILY COMPUTING's programs, please list them:

_____

_____

_____

_____

_____

TELL US ABOUT YOUR PROGRAMMING LEVEL

16. Have you ever modified a FAMILY COMPUTING program to meet your own needs? ☐ Yes ☐ No

17. Do you write BASIC programs yourself? ☐ Yes ☐ No

18. Have you learned anything about programming from FAMILY COMPUTING programs? ☐ Yes ☐ No
From our tutorials? ☐ Yes ☐ No

19. If you'd like to see FAMILY COMPUTING publish programs in languages other than BASIC, please list the languages:

_____

TELL US WHAT YOU LIKED—AND WHAT YOU DIDN'T

20. What have been your favorite FAMILY COMPUTING programs? _____

_____

Why did you like them? _____

_____

_____

21. What have been your least favorite FAMILY COMPUTING programs? _____

_____

Why did you dislike them? _____

_____

_____

22. Please tell us what your experience was with each of the following FAMILY COMPUTING programs:

a. Didn't see it
b. Wasn't available for my computer
c. Didn't interest me
d. Couldn't get it to run
e. Got it to run but it wasn't worth the effort

f. It was okay
g. I like it!

Mortgage Renegotiation Analysis (this issue) _____
Portrait of Liberty (this issue) _____
All-Purpose Labelmaker (June '86) _____
Maze Creator (May '86) _____
Fox and Geese (April '86, March '86) _____
Plumber's Blues (April '86) _____
Drill & Practice Outline (March '86) _____
Baby Box (Jan. '86) _____
Home Information Manager (Jan. '86, Nov. '85, Aug. '85) _____
Christmas Tree Construction Set (Dec. '85) _____
Wordcount (Dec. '85) _____
Dance of the Sugar-Plum Fairy (Nov. '85) _____
Other:

_____

_____

23. In general, on a scale of 1 to 5, (higher is better) how would you rate our . . . puzzles? ____ beginner programs? ____ financial programs? ____ educational programs? ____ games? ____ holiday-theme programs? ____ music programs? ____ graphics programs? ____ utility programs to help BASIC programmers? ____

TELL US WHAT YOU'D LIKE TO SEE

24. FAMILY COMPUTING normally does not include detailed documentation of each program because of space limitations. Which of the following types of documentation would you like to see, *even* if it meant there might be fewer programs in the issue?

More REMark statements in programs ☐ Yes ☐ No

Lists of variable names used and what each is used for ☐ Yes ☐ No

More detailed text explanations of how programs work ☐ Yes ☐ No

25. How eager would you be to see the following types of programs in FAMILY COMPUTING, where 1 = not interested and 5 = very interested? How long would you be willing to spend typing in such a program?

a program that will let you . . .	How interested?	How many hours?
learn a new BASIC command		
organize your record collection		
keep your deductible expenses in order		
learn an advanced programming skill		
link up to information services		
kill Xylons while avoiding their photon torpedos		
solve a puzzle, with clues given in a story and a drawing		
use your computer as a typewriter to write letters		
test your knowledge of American historical figures		
create kaleidoscopic images on your screen		
design letterheads or drawings to be printed out		
create your own word puzzles		
rearrange your furniture on-screen		
play your favorite song		

HOW IMPORTANT ARE OUR PROGRAMS TO YOU?

26. Do you base your decision to buy FAMILY COMPUTING in part on the programs? Please rank their importance on a scale of 1 to 5, where 1 = you aren't interested in the programs and 5 = you wouldn't buy the magazine without them.
Rating: ____

27. Would you be interested in the opportunity to buy FAMILY COMPUTING programs on disk? ☐ Yes ☐ No
If so, how much do you think a disk of 10 programs for your machine is worth? $____

TELL US WHAT WE'VE LEFT OUT

28. If there's anything else you'd like to tell us about our programs, please write it here, or enclose a separate sheet: ____

TAKE A CHANCE AT WINNING FREE MEMOREX FLOPPY DISKS!

Please fill in your address and telephone number so we can contact you in the event that you win a box of disks:

_____

_____

_____

_____

After filling out the questionnaire, put it in a stamped envelope and mail to:

Programmer Survey
FAMILY COMPUTING
730 Broadway
New York, NY 10003

Thank you for giving us your opinions!

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PUT A LABEL ON IT!

The data strips on the right contain one of the most popular programs ever to appear in FAMILY COMPUTING... **ALL PURPOSE LABEL MAKER**, by Joey Latimer.

The program, improved by reader suggestions, can handle most of your spur-of-the-moment label-making quickly and easily. Several readers modified the program to make mailing labels, while others created decorative designs to adorn kitchen spice bottles. One child wrote in that he used the program to label his baseball mitt, his bat, and his brother. **ALL PURPOSE LABEL MAKER** turned out to be useful in a number of different and unexpected ways.

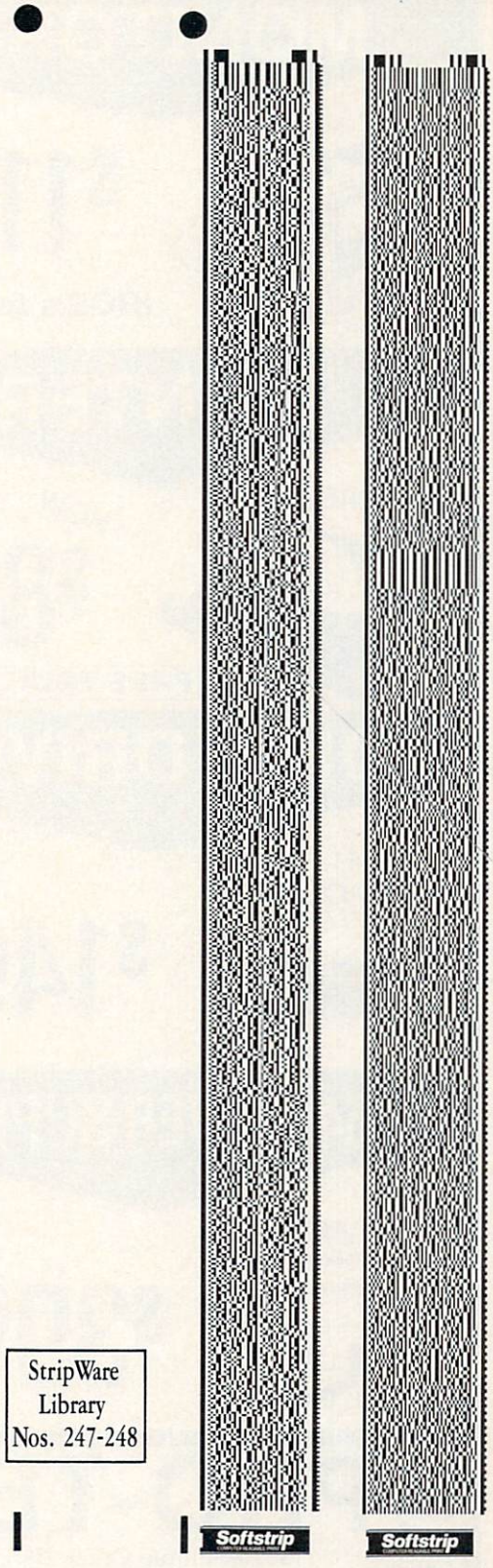
The data strip on the near right is designed for IBM PC users. The far one is for Apple II series computers. Read the appropriate data strip into your data disk.

Apple users can RUN the program from the Cauzin Communications disk. IBM users need to enter BASIC and type RUN "LABEL".

To use the program you'll need 3½ × 1 in. tractor-type labels (preferably one label wide) and a printer. You can make labels up to five lines long and each line may contain as many as thirty characters. Once a label is made, the printer automatically advances to the beginning of the next label.

There are a couple of hints you should be aware of for easier label making. Press RETURN or ENTER to leave a blank line. Use characters, such as an asterisk or minus-sign to make clever borders. Test your program, using tractor paper, before you try it with labels.

Make sure that your labels line up, side by side, with the labels printed on the tractor paper. If they don't, you may have the wrong size labels, or your printer's linefeed switch may need to be engaged (consult your printer manual for details.)



StripWare Library Nos. 247-248

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COMMODORE ★ ATTARI ★ IBM ★ APPLE

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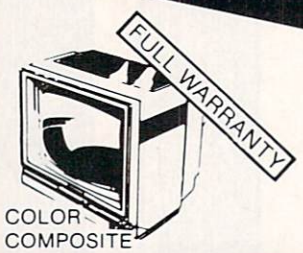

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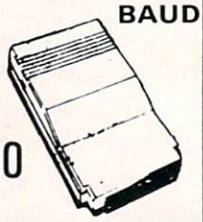

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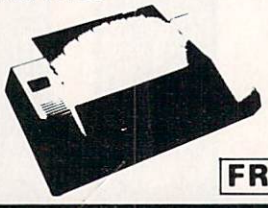

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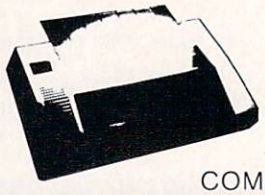

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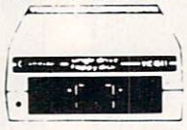

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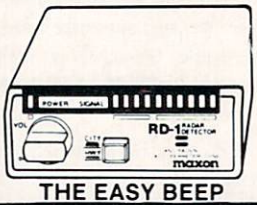

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This Month!!
GAME STRATEGY, page 54
MICROTONES, page 56
CONTEST, page 58

Spy Music For Tuneful Sleuths Page 56

Edited by Anne Krueger

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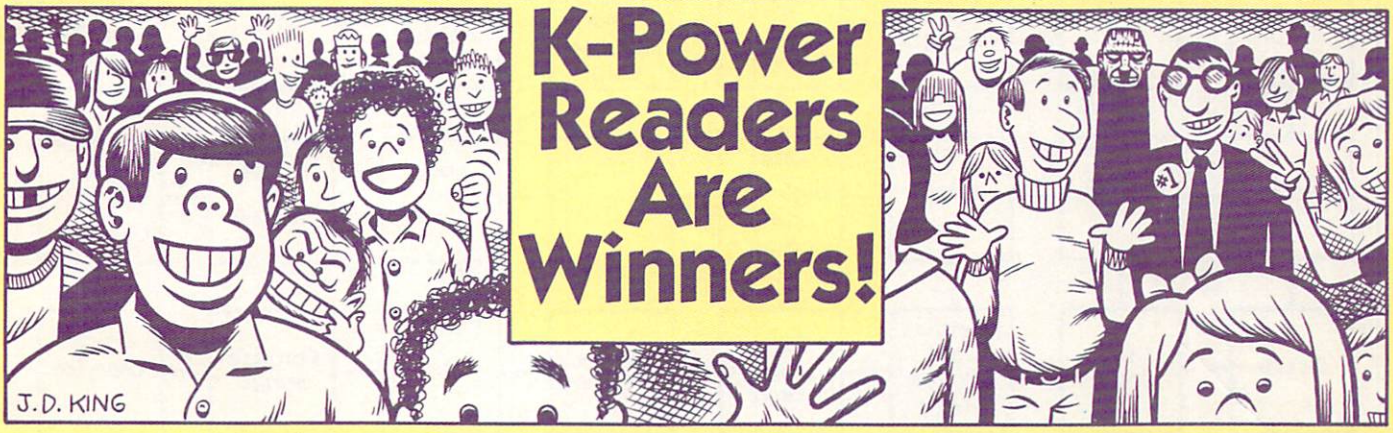
FOR THE COMPUTER GENERATION



K-Power Readers Are Winners!

■ After a grueling year of painful deliberation, we've finally decided on the winners of the highly competitive "Rename the SPECIAL KS Contest" (July, 1985). Our three top choices were: The K-KREW (**Dustin Flesher**, *14, Topeka, Kansas*; **Joseph Becker**, *14, Bethlehem, Pennsylvania*; **David Mayton**, *14, McKenney, Virginia*), K-CTRL (**Darren Hart**, *17, Atascadero, California*), and K-POWER'S VIDEO VANGUARD (**Fadi Samman**, *12, Potomac, Maryland*). Congrats! Despite the great entries, we've grown so attached over the last three years to the dubious SPECIAL KS nickname that we've decided to stick with it. We hope all of you are happy with our final choice. Thanks for your suggestions. (Our special thanks to Mindy Jones, age 17, for flattering us by wanting to start a SPECIAL K fan club!)

■ We've got some good news. Apparently, the hours spent in front of computers haven't completely frazzled the eyesight and pattern recognition of our readers. Not only did we get entries for our "What's Wrong With This Picture Contest" (September, 1985) with almost all of the answers correct, we got some with answers we hadn't even thought of (such as the dog has human teeth, the North Star is too low in the sky, and the barbells are different sizes)! Our congratulations and $25 go to the winners: **Ricky Daughtery**, *15, Augusta, West Virginia*; **Tammy Carter**, *17, Delano, California*; and **Bob Zippin**, *39, Lauderhill, Florida*.

The correct answers are as follows: 1) The rug is on the ceiling. 2) The diskettes are stapled to the wall. 3) A magnet is on the disk pile. 4) One window is day, the other night. 5) The time is wrong. 6) The date is wrong. 7) The legs on the table are uneven. 8) There's a dog on the computer. 9) The dog has a pocket-protector in its mouth. 10) A hamster (gopher) is in the fishbowl. 11) A cat is coming out of the disk drive. 12) The computer is plugged into *itself*. 13) There's a drink on the disk drive. 14) The "mouse" is a live mouse. 15) The phone receiver isn't attached to anything. 16) A cup is attached to the modem. 17) Why would a hacker need an abacus? 18) Or a typewriter? 19) Did you know any hackers who make their beds? 20) The clothes are ironed and folded. 21) The computer is *off*. 22) Real hackers don't use barbells. 23) Hackers don't eat healthful food. 24) There are only six days a week on the calendar.

What's wrong with this picture?

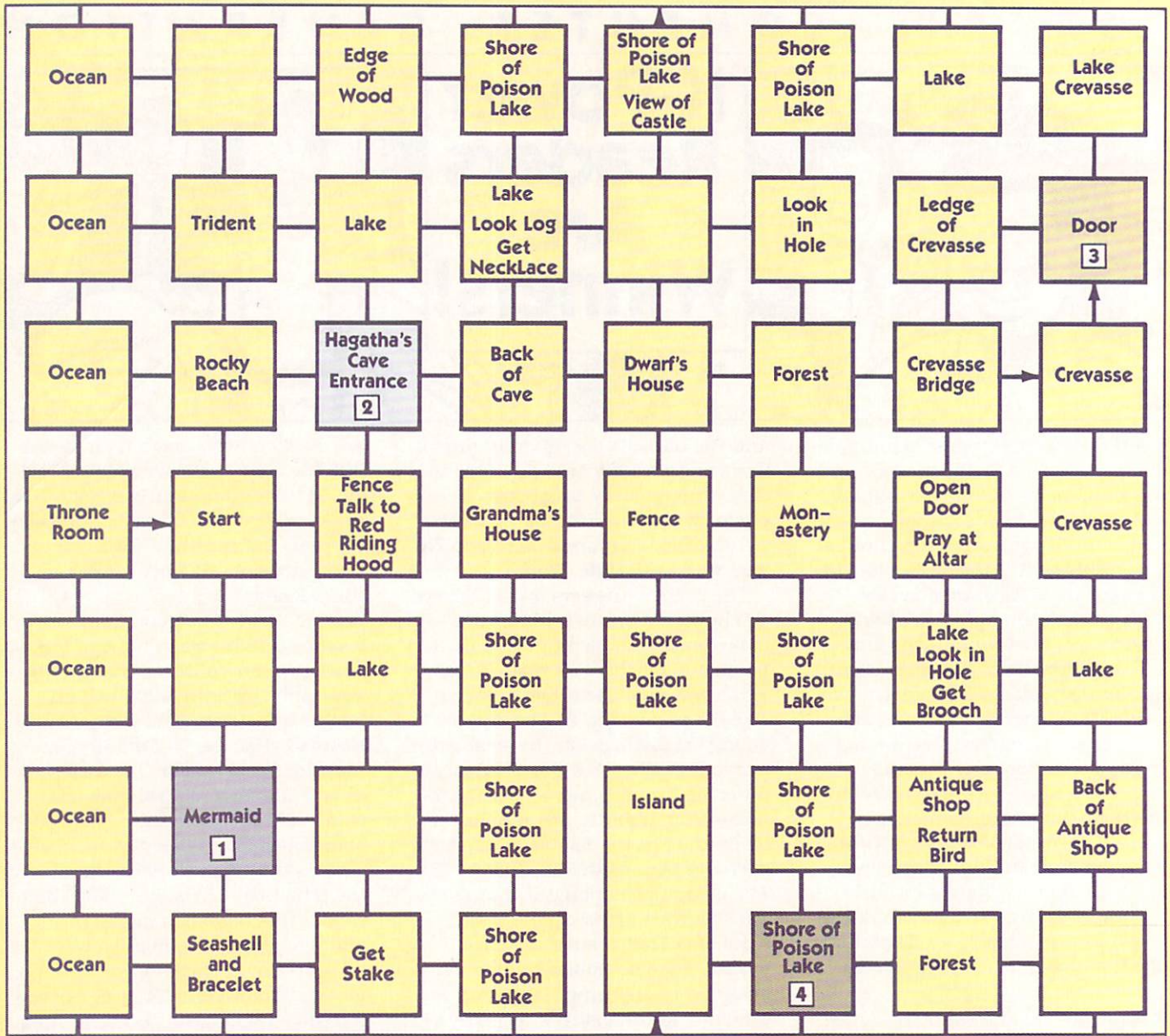
■ Our "Name that Book Contest" (October, 1985) wasn't one of our more popular contests, but the winners came up with some helpful hacker selections. The winners are: **Naushad Virgi**, *14, N. Fort Myers, Florida*; **David Maurer**, *18, Galesburg, Illinois*; and **Marc Holt**, *15, Gardendale, Texas*. Naushad recommended *The Book of Adventure Games II* by Kim R. Schuette (Arrays Inc./The Book Division, 1985), because "this book has maps, hints, and descriptions to many adventure games!" David chose *Sprite Graphics for the Commodore 64* by S. Larsen (Prentice-Hall, 1983) "because it explains the creation of sprite graphics step-by-step in an easy-to-learn way. I can now do sprites like a pro!" Marc's vote went to *Compute!'s First Book of Commodore 64 Sound and Graphics* by *Compute!* Editors (Compute! Publications, 1983) because "it tells readers the very basics of computing all the way up to sophisticated machine-language programs."

ILLUSTRATION BY J.D. KING

KING'S QUEST II

Sierra On-Line. Graphic adventure. Your mission: Rescue the maiden Valanice from her prison in an enchanted land and marry her (hints and game for IBM PC/PC*jr*).

Here is a map of the world of *King's Quest II*. Each area is represented by a square. Hints and noteworthy objects are shown in the corresponding squares. Empty squares contain nothing of interest. The longer hints go with their respective squares. Note: None of the sub-areas are included with this map. —BRADLEY MAZUREK, *Carrot River, Saskatchewan, Canada*



1

- Give Mermaid Brooch
- Ride Seahorse
- Give Trident to King Neptune
- Take Key and Bottle
- Open Bottle and Take Out Cloth

2

- Wait Until She Isn't There
- Take Cage (Don't Open It)

3

- Read Inscription on Each of Three Doors as You Open Them

4

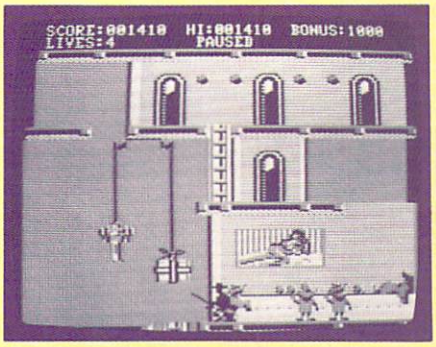
- You can walk across the water here if you've opened two of the magic doors and read the inscription on the third.

ZORRO

Datasoft. Arcade/adventure. Your mission: Fence your way through 20 screens of mystery and danger. Your final objective: Rescue a pretty senorita from the clutches of the evil Sergeant Garcia (hints and game for Apple).

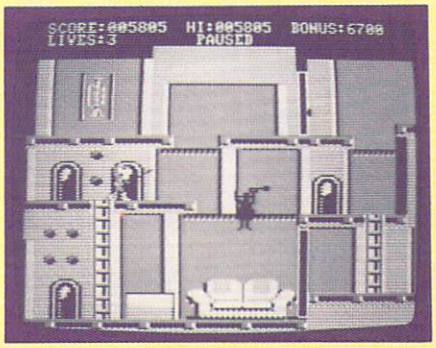
Screen One: When you start, climb the trellis and jump down on the well to get the handkerchief. To go to Screen Two, stay on the ground level when you go right.

Screen Two: To open the secret passage under the crate, get the bottle of wine from Screen Four (see below), and drop it next to the man on the far right side of the bar. Wait for him to drink it, then jump on him in order to get on the center ledge. Climb up to the top, and force a guard off the left edge and onto the chandelier. This will raise the crate, and reveal a ladder leading downstairs.



Screen Three: To get the boot, get the trumpet from Screen Four (see below), stand on the left side of the see-saw, and blow the trumpet.

Screen Four: To acquire the items appearing in the upper left-hand part of the screen, get the key and go to Screen Five. Climb to the top level and jump over the gaps back to Screen Four. Jump across the next two gaps (the key will open the door), and get the item you need. Items appear in this order: bottle of wine, branding iron (used to move a bull in another screen, which will let you get the horseshoe), first bell, second bell, trumpet, and a rose.



Screen Five: To open the passage beneath the gravestone, get the two bells from Screen Four, and place them in the arches on the top level. —RONALD CHIU, *16, Los Angeles, California.*

HINT HOTLINE

THE BARD'S TALE, Electronic Arts (Apple). Role-playing adventure. Your mission: With a party of six adventurers, explore the city of Skara Brae and the many dungeons and towers it holds. Your eventual goal is to slay the wizard Mangar, and free the city from his control.

Once you reach a high level (12th level and higher), go to Harkyn's Castle, then from the entrance, TELEPORT 5 NORTH, 12 EAST, 2 UP. At this location you'll be attacked by four groups of 99 "berzerkers." If you defeat them, you'll receive more than 50,000 experience points for each character. To increase your chances of survival, it's a good idea to have a wind dragon or greater demon with you.

To duplicate an item, add two characters, including one with the item you want to copy. Transfer the item to the second character, save him, and then turn off the computer (without saving the first character). Reload the game, and now both characters should have the item(s). Note: You lose gold when you turn off the computer.

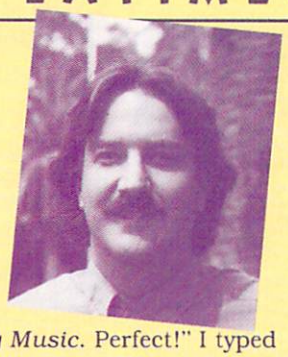
If you don't have any high-level *Wizardry* or *Ultima* characters (but own *Wizardry*), you can still start with upper-level characters. When you transfer characters from *Wizardry*, try moving them from the original scenario disk. The characters on *The Bard's Tale* disk will have very strange names, but most will be at the 12th or 13th level with good abilities. Note: Not all characters made this way will be good, and some might not even load properly.

If you start with high-level characters, don't forget you have to solve the dungeons for low-level characters before you can successfully complete the difficult ones. —LARS LANGSCHWAGER, *14, Saginaw, Michigan;* MICHAEL INTERHOLZINGER, *16, Fort Collins, Colorado;* JASON CZAPLEWSK, *15, Elkhorn, Nebraska*

We need a few good hints! Help K-POWER readers be all that they can be by sending us hints for your favorite games. We have all the *Zork* and *Ultima III* hints we can handle, but we'll gladly publish and pay $10 for hints we've not heard of. Send them to Hint Hotline, c/o K-POWER, 730 Broadway, New York, NY 10003.

MUSIC PROGRAMS

BY JOEY LATIMER



I put on my Ray Bans and hopped into my sizzling-red Rambler. The door automatically shut behind me, and I settled back to wait for auto-pilot to warm up. "Kinda quiet in here," I thought. I turned on the in-dash computer and looked at the music program directory. "Aha. *Spy Music*. Perfect!" I typed RUN and pressed the carriage return key. Everything was perfect until I spotted Inspector Blue's flashing lights in my rear-view mirror . . .

"So tell me, Inspector Blue," I began. "What are you charging me with this time???"

"Espionage, of course, Mr. Latimer. I can prove that you've stolen the secret K-POWER music routine!" Blue was red with anger. "I have witnesses who will testify that they heard *Spy Music* coming from your car. Only K-POWER's SPECIAL Ks know that music routine! You've stolen it. Where is it Mr. Latimer???"

"Up here," I responded, pointing to my head, "and in the current issue of FAMILY COMPUTING magazine. All you have to do is type it into your computer!"

Blue was now red with embarrassment. "You may go, Mr. Latimer."

ATARI 400/800, 600/800XL, & 130XE/*SPY MUSIC*

```
10 DIM V1(103,2),V2(35,2),V3(26,2):GRAPHICS 18
20 FOR I=1 TO 103:READ A,B:V1(I,1)=A:V1(I,2)=B:NEXT I
30 FOR I=1 TO 35:READ A,B:V2(I,1)=A:V2(I,2)=B:NEXT I
40 FOR I=1 TO 25:READ A,B:V3(I,1)=A:V3(I,2)=B:NEXT I
50 POSITION 0,5
60 PRINT #6;"-----SPY MUSIC-----"
70 P1=1:P2=1:P3=1:T1=0:T2=0:T3=0
80 SOUND 1,V1(P1,1),10,8:SOUND 2,V2(P2,1),10,6
90 SOUND 3,V3(P3,1),10,6
100 FOR DE=1 TO 42:NEXT DE:POKE 708,P2*6
110 T1=T1+1:T2=T2+1:T3=T3+1
120 IF T1=V1(P1,2) THEN T1=0:P1=P1+1:SOUND 1,0,0,0
130 IF T2=V2(P2,2) THEN T2=0:P2=P2+1:SOUND 2,0,0,0
140 IF T3=V3(P3,2) THEN T3=0:P3=P3+1:SOUND 3,0,0,0
150 IF P1<>104 THEN 80
160 GOTO 70
1000 DATA 144,1,144,1,121,1,121,1,108,1,108,1
1010 DATA 121,1,121,1,144,1,144,1,121,1,121,1
1020 DATA 108,1,108,1,121,1,121,1,144,1,144,1
1030 DATA 121,1,121,1,108,1,108,1,121,1,121,1
1040 DATA 144,1,144,1,144,1,162,1,144,4
1050 DATA 144,1,144,1,121,1,121,1,108,1,108,1
1060 DATA 91,1,96,1,144,1,144,1,121,1,121,1
1070 DATA 108,1,108,1,121,1,121,1,144,1,144,1
1080 DATA 121,1,121,1,108,1,108,1,91,1,96,1
1090 DATA 144,1,144,1,144,1,162,1,144,4,108,1
1100 DATA 108,1,91,1,91,1,81,1,72,1,81,1,91,1
1110 DATA 108,1,108,1,91,1,91,1,81,1,72,1,81,1
1120 DATA 91,1,144,1,144,1,121,1,121,1,108,1
1130 DATA 108,1,121,1,121,1,144,1,144,1,144,1
1140 DATA 162,1,144,4,193,1,193,1,193,1,193,1
1150 DATA 193,1,193,1,193,1,193,1,162,1,162,1
1160 DATA 162,1,162,1,162,1,162,1,162,1,162,1
2000 DATA 35,1,0,7,40,1,35,7,35,1,0,7,40,1
2010 DATA 35,1,35,1,40,1,35,4,35,1,0,7,40,1
2020 DATA 35,7,35,1,0,7,40,1,35,1,35,1,40,1
2030 DATA 35,4,53,1,0,7,60,1,53,7,35,1,0,7
2040 DATA 40,1,35,1,35,1,81,1,72,4,47,8,40,8
3000 DATA 0,32,60,1,0,7,64,1,60,7,60,1,0,7
3010 DATA 64,1,60,1,60,1,64,1,60,4,45,1,0,7
3030 DATA 47,1,45,7,60,1,0,7,64,1,60,1,60,1
3040 DATA 64,1,60,4,81,8,64,8
```

COMMODORE 64 & 128 (C 64 MODE)/*SPY MUSIC*

```
10 DIM V1(103,3),V2(35,3),V3(25,3)
20 S=54272
30 FOR I=0 TO 24:POKE S+I,0:NEXT I
40 POKE S+5,28:POKE S+6,192:POKE S+12,28
50 POKE S+13,192:POKE S+19,28:POKE S+20,192
60 POKE S+24,15
70 X1=S+4:X2=S+11:X3=S+18
80 FOR I=1 TO 103:READ V1(I,1),V1(I,2),V1(I,3):NEXT I
90 FOR I=1 TO 35:READ V2(I,1),V2(I,2),V2(I,3):NEXT I
100 FOR I=1 TO 25:READ V3(I,1),V3(I,2),V3(I,3):NEXT I
110 POKE 53280,4:POKE 53281,0:PRINT CHR$(147)
120 POKE 214,10:PRINT:PRINT TAB(15);"SPY MUSIC"
130 P1=1:P2=1:P3=1:T1=0:T2=0:T3=0
140 POKE S+1,V1(P1,1):POKE S,V1(P1,2)
150 POKE S+8,V2(P2,1):POKE S+7,V2(P2,2)
160 POKE S+15,V3(P3,1):POKE S+14,V3(P3,2)
170 POKE X1,33:POKE X2,33:POKE X3,33
180 FOR D=1 TO 40:NEXT D
190 T1=T1+1:T2=T2+1:T3=T3+1
200 IF T1=V1(P1,3) THEN T1=0:P1=P1+1:POKE X1,32
210 IF T2=V2(P2,3) THEN T2=0:P2=P2+1:POKE X2,32
220 IF T3=V3(P3,3) THEN T3=0:P3=P3+1:POKE X3,32
230 IF P1<>104 THEN 140
240 GOTO 130
1000 DATA 7,12,1,7,12,1,8,97,1,8,97,1
1010 DATA 9,104,1,9,104,1,8,97,1,8,97,1
1020 DATA 7,12,1,7,12,1,8,97,1,8,97,1
1030 DATA 9,104,1,9,104,1,8,97,1,8,97,1
1040 DATA 7,12,1,7,12,1,8,97,1,8,97,1
1050 DATA 9,104,1,9,104,1,8,97,1,8,97,1
1060 DATA 7,12,1,7,12,1,7,12,1,6,71,1,7,12,4
1070 DATA 7,12,1,7,12,1,8,97,1,8,97,1
1080 DATA 9,104,1,9,104,1,11,48,1,10,143,1
```

→

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```
1090 DATA 7,12,1,7,12,1,8,97,1,8,97,1
1100 DATA 9,104,1,9,104,1,8,97,1,8,97,1
1110 DATA 7,12,1,7,12,1,8,97,1,8,97,1
1120 DATA 9,104,1,9,104,1,11,48,1,10,143,1
1130 DATA 7,12,1,7,12,1,7,12,1,6,71,1,7,12,4,9,104,1
1140 DATA 9,104,1,11,48,1,11,48,1,12,143,1,14,24,1
1150 DATA 12,143,1,11,48,1,9,104,1,9,104,1,11,48,1
1160 DATA 11,48,1,12,143,1,14,24,1,12,143,1,11,48,1
1170 DATA 7,12,1,7,12,1,8,97,1,8,97,1
1180 DATA 9,104,1,9,104,1,8,97,1,8,97,1
1190 DATA 7,12,1,7,12,1,7,12,1,6,71,1,7,12,4
1200 DATA 5,71,1,5,71,1,5,71,1,5,71,1
1210 DATA 5,71,1,5,71,1,5,71,1,5,71,1
1220 DATA 6,71,1,6,71,1,6,71,1,6,71,1
1230 DATA 6,71,1,6,71,1,6,71,1,6,71,1
2000 DATA 28,49,1,0,0,7,25,30,1,28,49,7
2010 DATA 28,49,1,0,0,7,25,30,1,28,49,1,28,49,1
2020 DATA 25,30,1,28,49,4
2030 DATA 28,49,1,0,0,7,25,30,1,28,49,7
2040 DATA 28,49,1,0,0,7,25,30,1,28,49,1,28,49,1
2050 DATA 25,30,1,28,49,4
2060 DATA 37,162,1,0,0,7,33,135,1,37,162,7
2070 DATA 28,49,1,0,0,7,25,30,1,28,49,1,28,49,1
2080 DATA 25,30,1,28,49,4,21,31,8,25,30,8
3000 DATA 0,0,32,33,135,1,0,0,7,31,165,1,33,135,7
3010 DATA 33,135,1,0,0,7,31,165,1,33,135,1
3020 DATA 33,135,1,31,165,1,33,135,4
3030 DATA 44,193,1,0,0,7,42,62,1,44,193,7
3040 DATA 33,135,1,0,0,7,31,165,1,33,135,1
3050 DATA 33,135,1,31,165,1,33,135,4
3060 DATA 25,30,8,31,165,8
```

IBM PC*jr* & COMPATIBLES/*SPY MUSIC*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PCjr w/Cartridge BASIC J1.00, W/TV or monitor w/speaker. Tandy 1000 w/GW-BASIC 2.02 version 00.05.00 or 01.01.00, W/TV or monitor w/speaker.

```
10 SOUND ON:BEEP OFF:CLS:WIDTH 40:KEY OFF
20 LOCATE 12,14,0:PRINT "-SPY MUSIC-"
30 FOR I=1 TO 4:READ A$:B$=B$+A$:NEXT I
40 FOR I=1 TO 3:READ A$:C$=C$+A$:NEXT I
50 FOR I=1 TO 3:READ A$:D$=D$+A$:NEXT I
60 PLAY B$,C$,D$:GOTO 60
1000 DATA "mbMST155L801AA>CCDDCC<AA>CCDDCC<AA>CCDDCC"
1010 DATA "<AAAGA2AA>CCDDFE<AA>CCDDCC<AA>CCDDFE"
1020 DATA "<AAAGA2>DDFFGAGFDDFFGAGF<AA>CCDDCC"
1030 DATA "<AAAGA2EEEEEEEEGGGGGGGG"
2000 DATA "MNT155L802AP2P4P8GA2A4P8AP2P4P8GA"
2010 DATA "AGA2AP2P4P8GA2A4P8AP2P4P8GAAGA2"
2020 DATA ">DP2P4P8CD2D4P8<AP2P4P8GAAGA2E1G1"
3000 DATA "MNT155L803P1P1P1P1CP2P4P8<B>"
3010 DATA "C2C4P8CP2P4P8<B>CC<B>C2<FP2P4P8"
3020 DATA "EF2F4P8CP2P4P8<B>CC<B>C2G1<B1>"
```

VIC-20/*SPY MUSIC*

```
10 DIM V1%(103,2),V2%(35,2),V3%(26,2)
20 FOR I=1 TO 103:READ V1%(I,1),V1%(I,2):NEXT I
30 FOR I=1 TO 35:READ V2%(I,1),V2%(I,2):NEXT I
40 FOR I=1 TO 25:READ V3%(I,1),V3%(I,2):NEXT I
50 PRINT CHR$(147):POKE 214,8:PRINT
60 PRINT " -----SPY MUSIC------"
70 P1=1:P2=1:P3=1:T1=0:T2=0:T3=0:POKE 36878,6
80 POKE 36874,V1%(P1,1):POKE 36876,V2%(P2,1)
90 POKE 36875,V3%(P3,1)
100 FOR DE=1 TO 50:NEXT DE
110 T1=T1+1:T2=T2+1:T3=T3+1
120 IF T1=V1%(P1,2) THEN T1=0:P1=P1+1:POKE 36874,0
130 IF T2=V2%(P2,2) THEN T2=0:P2=P2+1:POKE 36876,0
140 IF T3=V3%(P3,2) THEN T3=0:P3=P3+1:POKE 36875,0
150 IF P1<>104 THEN 80
160 GOTO 70
1000 DATA 219,1,219,1,225,1,225,1,228,1,228,1
1010 DATA 225,1,225,1,219,1,219,1,225,1,225,1
1020 DATA 228,1,228,1,225,1,225,1,219,1,219,1
1030 DATA 225,1,225,1,228,1,228,1,225,1,225,1
1040 DATA 219,1,219,1,219,1,215,1,219,4
1050 DATA 219,1,219,1,225,1,225,1,228,1,228,1
1060 DATA 232,1,231,1,219,1,219,1,225,1,225,1
1070 DATA 228,1,228,1,225,1,225,1,219,1,219,1
1080 DATA 225,1,225,1,228,1,228,1,232,1,231,1
1090 DATA 219,1,219,1,219,1,215,1,219,4,228,1
1100 DATA 228,1,232,1,232,1,235,1,237,1,235,1,232,1
1110 DATA 228,1,228,1,232,1,232,1,235,1,237,1,235,1
1120 DATA 232,1,219,1,219,1,225,1,225,1,228,1
1130 DATA 228,1,225,1,225,1,219,1,219,1,219,1
1140 DATA 215,1,219,4,207,1,207,1,207,1,207,1
1150 DATA 207,1,207,1,207,1,207,1,215,1,215,1
1160 DATA 215,1,215,1,215,1,215,1,215,1,215,1
2000 DATA 237,1,0,7,235,1,237,7,237,1,0,7,235,1
2010 DATA 237,1,237,1,235,1,237,4,237,1,0,7,235,1
2020 DATA 237,7,237,1,0,7,235,1,237,1,237,1,235,1
2030 DATA 237,4,228,1,0,7,225,1,228,7,237,1,0,7
2040 DATA 235,1,237,1,237,1,235,1,237,4,231,8,235,8
3000 DATA 0,32,240,1,0,7,239,1,240,7,240,1,0,7
3010 DATA 239,1,240,1,240,1,239,1,240,4,232,1,0,7
3020 DATA 231,1,232,7,240,1,0,7,239,1,240,1,240,1
3030 DATA 239,1,240,4,235,8,239,8
```

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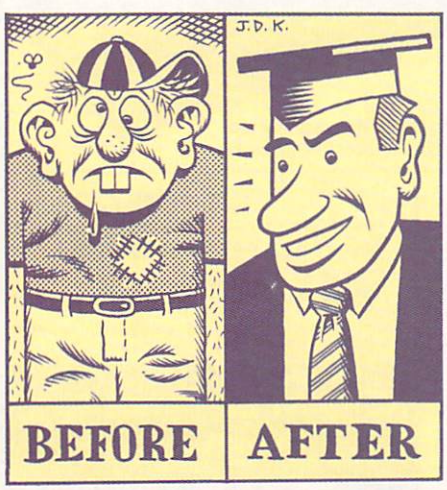

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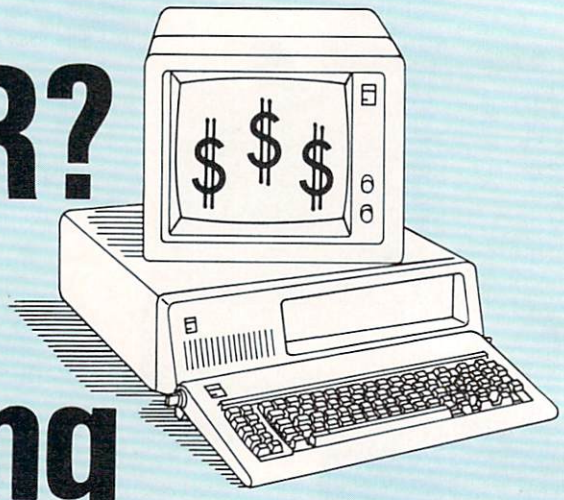

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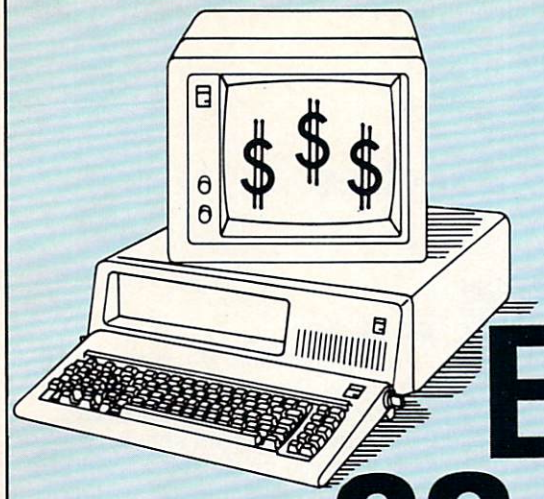

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NEW HARDWARE

COMPACT DISKS AND COMPUTERS
All You Ever Wanted to Know in 4.72 Inches

BY ANNE ARMSTRONG

Compact audio discs are the music industry's success story of the eighties. Last year alone some 2.4 million players and 50 million discs were sold worldwide, and demand outpaced production all year. The same laser technology is behind two new compact disc formats that may revolutionize the way information is distributed in the home and office.

CD-ROM (compact disc read-only memory) and the just announced CD-I (compact disc interactive) permit data and pictures to be stored on the disc along with sound. One 4.72-inch compact disc can store 600 megabytes of user data—the equivalent of over 1,000 floppies.

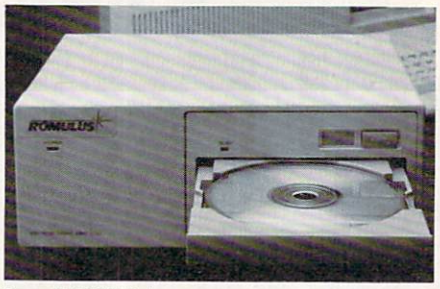
CDs are not replacements for floppies or hard disks in storing a *user's* data. You cannot "write" data to them. Because CDs are stamped out and mass produced like records at large factories, they are essentially a publishing medium.

For users, CD-ROM offers an alternative to expensive searching of online databases or to the often clumsy and difficult-to-read microfiche files. Reference material is a natural choice for this format. Publishers of large print reference works such as the *Reader's Guide to Periodicals*, and Dun & Bradstreet's *Million Dollar Directory* have already started converting their products into CD-ROMs for the library marketplace.

GROLIER'S ENCYCLOPEDIA

The best known consumer product currently available on CD-ROM is the electronic edition of *Grolier's Academic American Encyclopedia*. In its disc form, the 21-volume, 9 million word encyclopedia and its complete index use only about one-fifth of the disc's capacity. Future editions are expected to include a dictionary, thesaurus, and perhaps other reference works.

The *Electronic Encyclopedia* ($199) is available from several sources. To run it you need a CD-ROM drive, cable, and interface for IBM PC or compatibles, Atari 520 ST, or Apple IIe. The Library Corp. sells the Hitachi 1502S CD-ROM drive ($680), and it includes a connecting cable and interface for the IBM PC or Atari 520ST. KnowledgeSet offers the Sony Romulus CD-ROM drive ($849) for the IBM PC. Microtrends sells the *Electronic Encyclopedia* and the Philips CM-100 CD-ROM drive ($1,495) for the IBM PC and compatibles. Microtrends also sells an interface for the Apple IIe ($1,190) that allows you to connect a CD-ROM drive.



Sony CD ROM Drive

THE GREAT CD HOPE

Philips and Sony, creators of the standard for all the compact disc formats, believe the best bet for the consumer market is the new format (CD-I) that combines game technology, mass data retrieval, video, and audio in a stand-alone format. These yet-to-be-made drives will not require a computer. The computer, in effect, will be built into the drive along with the operating system.

CD-I discs will store animated video, up to 7,000 still pictures, 16 hours of speech-quality sound, or a mixture of several forms.

CD-I systems are expected on the market by late 1987. Software developers are already at work. *The Record Group* has several CD-I discs in the works. Among them are an interactive tour of London, street for street, from Roman days to the present; a genealogical database that serves as an educational encyclopedia as well as a maze game; an audio and visual dictionary that sings and dances; a classic adventure game; an interactive drama seen from the viewpoints of a dozen different characters; and a time machine that shows what was going on in any given year.

CD CARS

One application of the CD technology currently under development is mobile mapping systems for cars. Prototypes have been shown at several Japanese trade shows and Philips has already demonstrated a prototype of its CARIN (Car Information and Navigation) system. A compact disc player in the car, which can be used to play music discs, is used to read cartographic data from a disc. The systems use various methods to find out where the car is, but most plan to eventually hook into the NAVSTAR satellite navigation system. Once the on-board computer knows where the car is located and where the driver wishes to go, it consults the CD-ROM for the map and plots the best course.

First installations of the CD mapping devices are likely to be in commercial vehicles—delivery trucks, emergency vehicles, and taxis. Once prices drop enough, U.S. car manufacturers will consider adding the systems as an option.

HOME USES

The CD discs have great potential for assistance in home management. The possibilities include: a home repair manual that combines pictures with instructions, a list of tax codes for preparing tax returns, a college guide equipped with video, a phone book, and yellow pages that answer such questions as what store is closest to a given address.

Any large compilation of material that is consulted frequently, is expensive to reprint and replace, and would have value added by letting the computer do the looking is a candidate for CD-ROM and CD-I. The best applications will probably be a blend of several different products. This process will probably start later this year, build slowly, and culminate into a boom by 1990 when all you ever wanted to know will be available on small silver discs. FC

CD ROM INFO

Grolier, (212) 696-9750; Library Corp., (800) 624-0559; KnowledgeSet, (408) 375-2638; Microtrends, (312) 310-8928; The Record Group, (818) 953-3211.

ANNE ARMSTRONG *is managing editor of* CD Data Report, *a monthly newsletter covering the compact disc industry.*

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C-17 Maze Madness!
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C-26 Mission Asteroid
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C-30 Vital Data Keeper
C-31 Wordmaster Senior
C-32 Master Word
C-33 Personal Spreadsheet
C-34 gBASE, database manager
C-35 My 64—A Computer Tutor
C-36 Commodore 64 Utilities
C-37 Financial Analyzers
C-38 Home and Business Card File
C-39 Home Expense Manager
C-40 Home Finance Organizer 1
C-41 Home Finance Organizer 2
C-42 Home Income Manager
C-43 Home Money Manager
C-44 Home Property Manager
C-45 Money Minder
C-46 Personal File Keeper
C-47 Personal Investment Manager
C-48 Family Tree
C-49 Electronic Scheduler
C-50 Pro Financial Organizer
C-51 Recipe Box
C-52 Tax Record Organizer

Education Series

C-53 Number Builder
C-54 Number Chaser
C-55 Hide & Seek
C-56 Picture This
C-57 Let's Count
C-58 Time Trucker
C-59 Fancy Face
C-60 Math Manor
C-61 Typing Tutor
C-62 Speed Reader

Electric Book Co. Education Series

C-63 Why?
C-64 When?
C-65 The Three Bears
C-66 Gingerbread Man
C-67 Baby Animals
C-68 Hoppy the Curious Kangaroo
C-69 Wild Animals
C-70 Tom Thumb
C-71 I Was a Second Grade Werewolf
C-72 Tough Eddie

For the Apple II+, IIc, IIe

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A-18 Financial Planner
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A-20 Monthly Budgeter
A-21 Nutrition Monitor
A-22 Securities Portfolio
A-23 Recipe Box
A-24 Database Manager
A-25 Disk Library
A-26 Electronic Calendar
A-27 Electronic Phone Book
A-28 Family Tree
A-29 Personal Spreadsheet
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A-42 Addition II
A-43 Addition III
A-44 Addition IV
A-45 Subtraction I
A-46 Subtraction II
A-47 Subtraction III
A-48 Multiplication I
A-49 Multiplication II
A-50 Multiplication III
A-51 Division I
A-52 Division II
A-53 Division III
A-54 Division IV

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SOFTWARE GUIDE

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews follow the chart. Unless otherwise noted, all programs are in disk format; minimum memory requirements are 48K for Apple II series, 48K for Atari, 128K for IBM PC/PC*jr* or compatibles, and 128K for Macintosh. "Atari" alone denotes the 800/XL/XE series. "C 64/128" means the software will run on both a C 64 and a C 128 computer in C-64 mode; "C 128" alone means the software will run only on that machine.

Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system; in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphic capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS & PRODUCTIVITY

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
BETTER WORKING WORD PROCESSOR Spinnaker Software One Kendall Square Cambridge, MA 02139 (617) 494-1200 $50 (C 64); $60 (Apple) ©1985	Running this writing tool is a snap; all functions are available through on-screen windows. Includes 50,000-word spelling checker, but the program sometimes "locks up" (a bug) when checking spelling. Even so, the program is good, and so is the price. —MORGENSTERN	Reviewed on C 64/128. Also for 64K Apple.	30-day warranty. $5 thereafter or for backup.	★ ★ ★	★ ★	★ ★	N/A	E	★ ★ ★
EASY MicroPro International Corp. 33 San Pablo Ave. San Rafael, CA 94903 (415) 499-1200 $150 ©1985	As a word processor designed for beginners, *Easy* is relatively powerful. You control it through menus, or by commands as you advance. However, the documentation is incomplete.† —MORRIS	256K IBM PC/ PC*jr*.*	90-day warranty. User makes backup.	★ ★ ★	★ ★	★ ★ ★ ★	N/A	A	★ ★ ★
FONTASY Prosoft 7248 Bellaire Ave. N. Hollywood, CA 91603 (818) 765-4444 $70 ©1985	Turn out professional-quality pages for newsletters, flyers, etc., and combine text (in 28 different typefaces) with graphics. Draw with *Fontasy* or add clip art from separate disks.† —SUMMERS	256K IBM PC.* 448K-640K recommended. Graphics adapter, printer. Mouse optional.	90-day warranty. User makes backup. 30-day money-back guarantee.	★ ★ ★ ★	★ ★ ★	★ ★	★ ★ ★	A	★ ★ ★ ★
MICRO PHONE Software Ventures Corp. 2907 Claremont Ave., #220 Berkeley, CA 94705 (415) 644-3232 $75 ©1985	A communications package that's perfect for beginners, pros, or anyone in between. It's exceptionally easy to use, yet exceptionally powerful, too—a rare combination in software.† —AKER	Macintosh. 512K recommended. Modem.	90-day warranty. User makes backup. 30-day money-back guarantee.	★ ★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★
MOUSE CALC Version Soft, distributed by International Solutions 910 W. Maude Ave. Sunnyvale, CA 94086 (408) 773-0443 $150 ©1984, 1985	Point-and-click number crunching works very well with this strong, mouse-driven spreadsheet. Useful for controlling your personal finances or more sophisticated business tasks. *Mouse Calc* is also easy to operate.† —MORGENSTERN	128K Apple IIe/IIc. Mouse.	90-day warranty. $10 thereafter or for backup.	★ ★ ★ ★	★ ★ ★	★ ★ ★	★ ★	E	★ ★ ★
OFFIX Emerging Technology, distributed by Tandy Corp. One Tandy Center Ft. Worth, TX 76102 (817) 390-3011 $100 ©1984, 1985	If you have an office at home or a small business, consider this full-featured filing program combined with a rudimentary word processor. On-line help makes *Offix* suitable for novices as well as more experienced users. —ZORNBERG	Reviewed on Tandy 1000. Also for 256K IBM PC/PC*jr*,* Tandy 1200/2000. 2nd drive or hard disk.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart.

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

EDUCATION/FUN LEARNING

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
COMPUTER SCRABBLE Leisure Genius, distributed by Gessler Educational Software 900 Broadway New York, NY 10003 (212) 673-3113 $40 ©1985	Here's Scrabble with a French twist for foreign language buffs. The computer uses a 20,000-word dictionary; if your French vocabulary is larger, you'll have an advantage. It's fun, but the documentation is inadequate and you can't save a game in progress. For up to four players. —MORRIS	Reviewed on Apple. Also for C 64/128. Color monitor recommended.	60-day warranty. $12 for backup within six months.	★ ★ ★	★ ★	★ ★ ★	N/A	E	★ ★
THE FIRST MEN IN THE MOON MATH Fisher-Price, a division of Spinnaker Software One Kendall Square Cambridge, MA 02238 (617) 494-1200 $25 (C 64); $40 (Apple) ©1985	Kids solve arithmetic problems to get Professor Cavor to the moon. Once there, they explore caverns; and math word problems appear for solution. My 10-year-old liked it because it challenged and helped him at the same time. —ELTGROTH	Reviewed on Apple. Also for C 64/128. Joystick optional.	30-day warranty.	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★	@	★ ★ ★
INSTANT PASCAL Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010 $140 ©1985	A wonderful tool for learning Pascal. It gives the novice assistance with programming syntax, gentle reminders when errors are made, and instant gratification when work is done properly.† —McCORNACK	128K Apple IIe/IIc. Color monitor, mouse, printer recommended.	90-day warranty. Comes with backup.	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★	E	★ ★ ★
MICROZINE, VOLUME 13 Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3501 $40 ©1985	Two high-quality adventures with clear educational value are the main attraction here. Learn how to recognize the moral of a story, distinguish good from bad grammar, and more. For ages 9+. —MORRIS	Apple. Color monitor recommended. Printer optional.	60-day warranty. $10 for 10 months thereafter.	★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★	E	★ ★ ★
THE OTHER SIDE Tom Snyder Productions 123 Mt. Auburn St. Cambridge, MA 02138 (617) 876-4433 $70 ©1985	The game's objective is to build a bridge across the chasm which separates the two sides of the world. Resolving questions of international conflict and co-operation are among the themes of this complex simulation. Suitable for ages 12+.† —MORRIS	Reviewed on Apple. Also for IBM PC/PC*jr*.* Color monitor, modem optional.	60-day warranty. $10 thereafter.	★ ★ ★	★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
PETER RABBIT READING Fisher-Price, a division of Spinnaker Software (*See above for address and phone*) $25 (C 64); $40 (Apple) ©1985	Peter Rabbit, that popular fellow from the Beatrix Potter tales, motivates young children (ages 3-6) to match letters and learn to recognize and spell simple words. The computer talks, too. Delightful.† —ELTGROTH	Reviewed on Apple. Also for C64/128. Joystick recommended.	30-day warranty. $5 thereafter or for backup.	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	@	★ ★ ★ ★
STICKYBEAR PRINTER Weekly Reader Family Software 245 Long Hill Road Middletown, CT 06457 (203) 638-2400 $40 ©1985	The advantages of this imitation of *The Print Shop*? An easy program that prints in color (with correct printer), allows multiple graphics on a page, and even makes greeting cards. The disadvantages? No banners or full-page signs. —MORGENSTERN	Apple. Scribe, ImageWriter, ImageWriter II, C.Itoh Prowriter, Epson FX-80, or Okidata 82/92 printer.	90-day warranty. $10 for backup.	★ ★	★ ★ ★	★ ★ ★	★ ★	E	★ ★
TYPING WELL Learning Well 200 S. Service Road Roslyn Heights, NY 11577 (516) 621-1540 (800) 645-6564 $50 ©1985	A comprehensive and engaging learn-to-type program. The proper fingering is graphically displayed, and there are a variety of games and drills for practice at all levels. Suitable for ages 9 through adult. —FRANK	Apple. Color monitor recommended. Printer optional.	60-day warranty. $12 for 10 months thereafter. $12 for backup within 45 days.	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★

RATINGS KEY **O** Overall performance: **D** Documentation: **EH** Error-handling: **GQ** Graphics quality: **EU** Ease of use: **V** Value for money: ★ Poor: ★★ Average: ★★★ Good: ★★★★ Excellent: N/A Not applicable: E Easy: A Average: D Difficult: @ Easy to average:† Longer review follows chart.

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

ENTERTAINMENT REVIEWS BY JAMES DELSON

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	PS	GQ	EU	V
ALTER EGO Activision 2350 Bayshore Frontage Rd. Mountain View, CA 94043 (415) 960-0410 $50-$60 ©1985	A fascinating role-playing simulation with a different slant: You follow a modern-day character from birth to death by answering questions that trace the trials and tribulations of your "life."†	Reviewed on Macintosh. Also for Apple, C 64/128, IBM PC/PC*jr*.*	90-day warranty. $7.50 thereafter.	★★★★	★★★	★★★	★★★	E	★★★
BATTLEGROUP Strategic Simulations, Inc. 1046 N. Rengstorff Ave. Mountain View, CA 94043 (415) 964-1353 $60 ©1986	It's the Allies fighting the Germans on the Western Front during World War II in this fast-moving, state-of-the-art, tactical-combat game. With a modified construction set for extended play. For ages 12+.	Reviewed on Apple. Also for C 64/128.	30-day warranty. $10 thereafter. $12 for backup.	★★★	★★★★	★★★★	★★	D	★★
CHAMPIONSHIP GOLF Gamestar, a division of Activision (*See above for address and phone*) $50 ©1986	Highly detailed, 3D graphics of each hole make this excellent golf game even greater. Takes a lot of practice to learn the strokes, but it's well worth the effort. For ages 10+.†	IBM-PC/PC*jr** (pre-release version reviewed).	90-day warranty. $7.50 thereafter.	★★★★	★★★★	★★★★	★★★★	D	★★★★
DEJA VU Mindscape, Inc. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667 $50 ©1985	As a hard-boiled private investigator with amnesia, you're out to crack not one, but a whole series of cases which involve many puzzles and offer you many clues to unravel. For ages 12+.	Macintosh. 2nd drive recommended.	90-day warranty. $21 thereafter.	★★★	★★★	★★★	★★★★	A	★★★
GARRY KITCHEN'S GAMEMAKER Activision (*See above for address and phone*) $40 (C 64) ©1985 $50 (Apple) ©1986	This comprehensive arcade-game construction set is a major step forward in amateur "design-ware." But be warned, it's a big undertaking for all but the most dedicated. For ages 12+.†	Reviewed on 64K Apple. Also for C 64/128. Joystick.	90-day warranty. $7.50 thereafter.	★★★★	★★★★	★★★★	★★★★	D	★★★★
THE GOONIES Datasoft 19808 Nordhoff Place Chatsworth, CA 91311 (818) 886-5922 $30-$40 ©1985	By making your two characters perform actions in concert, you advance the plot in this lively strategy/arcade game "inspired by" last summer's film *The Goonies*. A clever play system offers fun for ages 8+.	Reviewed on Atari. Also for Apple, C 64/128.	90-day warranty. $7.50 thereafter.	★★	★★	★★★	★★★	A	★★
KIKSTART Mastertronic International 7311B Grove Road Frederick, MD 21701 (301) 695-8877 $10 ©1984	You'll need excellent reflexes and split-second timing to keep going in this exciting dirtbike simulator. Ideal for younger players (ages 6+) and beginners, but too easy for the experienced.	C 64/128. Joystick.	90-day warranty.	★★	★★	★★★	★★	E	★★★★
RINGS OF ZILFIN Strategic Simulations, Inc. (*See above for address and phone*) $40 ©1986	More joystick action than role-playing adventure, this hybrid fantasy game is good, but not exceptional. Fast-moving strategy for ages 10+.	Reviewed on Apple. Also for C 64/128.	30-day warranty. $10 thereafter. $12 for backup.	★★★	★★★	★★★	★★	A	★★★
SQUIRE Blue Chip Software 6744 Eton Ave. Canoga Park, CA 91303 (818) 346-0730 $50 (Apple); $60 (IBM/Mac) ©1984	Build your nest egg for retirement as you buy and manage a diverse portfolio of investments from stocks and commodities to real estate and an IRA. A good introduction to financial simulations, yet still challenging for experts. Ages 12+.	Reviewed on 64K Apple. Also for IBM PC/PC*jr*.* 512K Macintosh.	90-day warranty. $5 thereafter. $12 for backup.	★★★	★★★★	★★★	★★	A	★★★
STRATEGIC CONQUEST PBI Software 1111 Triton Drive Foster City, CA 94404 (415) 349-8765 $50 ©1985	The world here is fictional. You get to explore it and then conquer it by using a modern army, navy, and air force. A superb war game for one player; it's one of the year's best.†	Macintosh.	30-day warranty. $5 thereafter	★★★★	★★★★	★★★★	★★★	A	★★★★

RATINGS KEY **O** Overall performance: **D** Documentation: **PS** Play system: **GQ** Graphics quality: **EU** Ease of use: **V** Value for money: ★ Poor: ★★ Average: ★★★ Good: ★★★★ Excellent: N/A Not applicable: E Easy: A Average: D Difficult: † Longer review follows chart.

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 64 for information such as backup policies and addresses of software publishers.

HOME BUSINESS & PRODUCTIVITY

Easy

HARDWARE REQUIREMENTS: 256K IBM PC/PCjr.
PUBLISHER: MicroPro Int'l Corp.
PRICE: $150

For a relatively powerful word processor to also be appropriate for beginners, a lot of hand-holding has to take place.

That's what you get with *Easy*. The manual is easy to read and includes an elementary introduction to word processing. The essential features of the program are taught through on-screen tutorials that assume no previous knowledge of either computers or word processors. An extensive set of help screens is always just a keystroke away. Simple errors are easy to correct, and even major mistakes such as unintentional deletion of text can be easily undone. And since *Easy* is almost entirely menu-driven, it is not necessary to memorize long lists of specialized commands.

Easy includes all the basic features you might expect in a mid-priced word processor, from copying and moving text, to printing page headers and footers. Text can be boldfaced, underlined, and set in any typeface or font your printer will offer (the software can be tailored instantly to more than 100 different printers). When you save a document, *Easy* automatically creates a backup copy of the original and stores it on disk in case you subsequently discover a major error. And a 65,000-word dictionary will check for spelling mistakes when you're done writing.

Here's what you don't get with *Easy*. For one, blocks of text are limited to only 750 characters; this sets a fairly modest limit on the amount of material that can be moved, copied, or deleted. Far more bothersome is the fact that neither the manual nor the on-screen tutorials adequately cover most of the more advanced features such as "dot commands" (for page formatting), effective use of different typefaces, and customized dictionaries. A beginner is unlikely to be able to use these features effectively without considerable trial-and-error.

All together, these are not minor problems in a package which is marketed especially for use by inexperienced operators. Overall, *Easy* is good software, and in the long run, it's better to have good software marred by incomplete documentation than to have lesser software with the greatest of documentation.

—TONY MORRIS

Fontasy

HARDWARE REQUIREMENTS: 256K IBM PC.
PUBLISHER: Prosoft
PRICE: $70

Apple's Macintosh gave a lot of us IBM PC owners an inferiority complex when it came to graphics. While Mac users were turning out professional-looking brochures and newsletters in elegant typefaces, we were stuck with clumsy graphics programs that sometimes couldn't produce any text.

All that, thank goodness, has changed. *Fontasy* is one of the prime examples of the "new look" in PC text-art programs. Packed with 28 different fonts—ranging from subdued, business-like styles to a crackling July 4th—this page-making program also lets you design your own fonts.

You enter text for your creation directly from the keyboard. Alternatively, you can use a word processor to create the text and let *Fontasy* read it onto the screen. Text may be printed in columns (like a newspaper), and embedded commands let you control formatting and type style. You can combine word wrap, both right and left justification, and proportional spacing so that your text really looks typeset.

Fontasy is a tool for drawing, too, although in black and white only. You can draw freehand, or generate ovals, squares, and lines, then fill closed areas with any of 95 fill patterns. There's a sophisticated UNDO command to recover from mistakes.

Fontasy is very fast, since it keeps your work in memory rather than on a disk file. And that's where a problem can lie for many users: *Fontasy* eats up memory. Maximum page size depends on how much memory you have; I can create only half of one page at a time with my 320K PC. Two files can be printed back to back to form a full page, but *Fontasy* works best with 448K and up.

Commands must be memorized, which is efficient for the experienced user, but a bit difficult to learn. Fortunately, the program comes with two command summary cards—one, a color-coded diagram of the keyboard and the other, a summary of the commands—and several on-line help screens. The tutorial-style manual is adequate in describing *Fontasy*, but falls short in its coverage of the font creation function.

If art is your main concern, a program that is meant specifically for graphics might be a better choice. But for producing high-quality printouts of words mixed with pictures, *Fontasy* is hard to beat.

—TAN A. SUMMERS

MicroPhone

HARDWARE REQUIREMENTS: Macintosh.
PUBLISHER: Software Ventures Corp.
PRICE: $75

When it comes right down to it, most communications packages do the same thing: they let you send and receive information over telephone lines with your modem. In order for any program to stand out from the crowd, then it has to have some very special features, and *MicroPhone* does.

The Macintosh may be famous for ease-of-use, but *MicroPhone* takes the concept one step further as it lets you put your communications session on autopilot. If you use a commercial service like Delphi or CompuServe, this program will call and log in for you, giving your ID number and password in response to the prompts from the other computer. When you're ready to quit, all you have to do is hit the "Log Off" button on-screen, and *MicroPhone* will do the rest.

With the macro feature called "scripting," you can automate any sequence of actions that you perform often. If, for instance, you log on to a local bulletin board every day, collect your electronic mail, and post a general message, you can record these actions once, and forever afterward replay them at a single keystroke. Scripting goes beyond simple recording, however; there is a mini-programming language that can be used to build complicated scripts for any on-line situation. If that sounds daunting rather than exciting, you probably don't need convoluted scripts, and you can

stick to the recording method for simple sequences.

MicroPhone's thorough and easy-to-read manual contains not only instructions for using the program, but enough general-purpose information about telecomputing to get even the most timid beginner familiar with the necessary terms and concepts.

When you want your microcomputer to use your telephone, this package's great name says it all. Whether you're just starting out or are an old hand at going on-line, *MicroPhone* is practically perfect.

—SHARON ZARDETTO AKER

MouseCalc

HARDWARE REQUIREMENTS: 128K Apple IIe/IIc.
PUBLISHER: Version Soft, distributed by International Solutions
PRICE: $150

The trend toward using Macintosh-style mouse control and pull-down menus for every kind of software imaginable has produced some programs that are streamlined and easier to use than keyboard-alone versions, and others whose practicality is questionable at best. After setting up an experimental budget with *MouseCalc*, I'm now convinced that spreadsheeting is one of those applications that truly does benefit from mouse control—at least in the sophisticated form found in this French import.

A spreadsheet is basically an electronic piece of paper organized into rows and columns, and automatically performs mathematical calculations on the figures you provide. In *MouseCalc*, the mouse speeds up several essential operations. You can move from place to place on your spreadsheet by pointing and clicking. Changing the width of a column couldn't be easier; you just grab the right side of the column and drag it until it's the correct size.

MouseCalc allows you to open two separate windows simultaneously so you can view two sections of a spreadsheet that is too large for a single screen. The graphing function, another welcome capability, helps you make bar charts or line graphs from your figures.

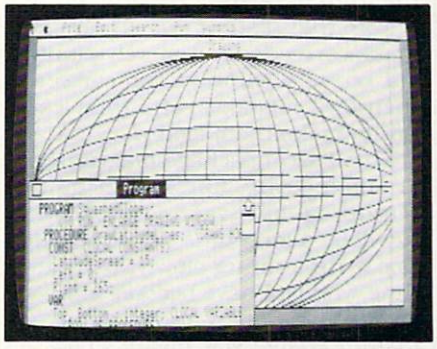
If you want to print out the graphs, your printer had better bear the Apple or Epson brand, or no luck. That's my only real complaint with the program, though. With the ease of use from the mouse, all the usual spreadsheet functions, and more (such as if-then calculations), *MouseCalc* can help you work "smarter."

—STEVE MORGENSTERN

EDUCATION/ FUN LEARNING

Instant Pascal

HARDWARE REQUIREMENTS: 128K Apple IIe/IIc.
PUBLISHER: Apple Computer, Inc.
PRICE: $140
PUBLISHER'S SUGGESTED AGES: 12+



Instant Pascal is a great learning tool. It gives the novice Pascal programmer assistance with spelling and punctuation (syntax), gentle reminders when minor errors are made, and instant gratification when the work is done properly. And all of this is in a Macintosh-like environment of bright screen, pull-down menus and windows, a mouse, and a desktop.

These features have a hidden cost: *Instant Pascal* is probably the slowest-running version of Pascal (or any other language) you will ever experience. This is because *Instant Pascal* is an interpreted language (like most BASICs) rather than a compiled language (like most versions of Pascal). With interpreted languages, each line of code must be translated into machine code as the program runs. Compiled languages run more quickly because the translation to machine code occurs before the program is run.

With most Pascals, you write the program, save it, compile it, and finally run it. In *Instant Pascal*, you just write and run. The advantage? Well, just between us student programmers, a program which runs right on the first try is a rare thing indeed. Most of your programming time will be spent finding errors and fixing them, so the time you save by

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CIRCLE READER SERVICE 3

SOFTWARE REVIEWS

not needing to resave and recompile your program is considerable.

More time is saved by the built-in spelling-and-grammar checker, which runs as you edit programs. If you type a reserved word—the vocabulary of Pascal—it is displayed in bold capital letters. If you misspell a reserved word, it stays the way you typed it. You will quickly grow accustomed to reserved words like PROGRAM and BEGIN jumping out at you. The word "prowgram" would be accepted, but not converted to bold caps. It's probably a misspelling, but you might be putting messages on the front of boats.

Note that *Instant Pascal* does not make corrections, it merely points out errors. Beginners can correct their own mistakes, and thus learn not to make them again.

This Pascal package makes programming easy, fun, and instantly rewarding. If you are new to Pascal, it will be a long time before you notice it runs rather slowly. By that time, you will have become a pretty good programmer, and that is what *Instant Pascal* was meant to do.

—JACK MCCORNACK

The Other Side

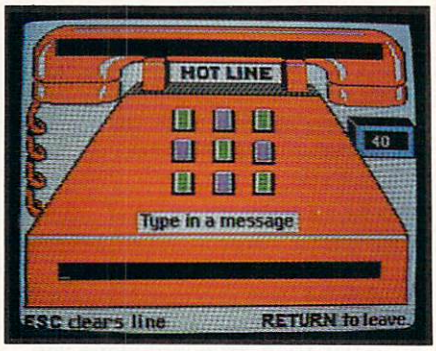
HARDWARE REQUIREMENTS: Apple, IBM PC/PC*jr*.
PUBLISHER: Tom Snyder Productions
PRICE: $70
PUBLISHER'S SUGGESTED AGES: 12+

"Enemy patrols are attacking near our capital. Because of the bombs, global contamination of fuel supplies has reached the danger level. I don't think the world is going to survive much longer."

It took several minutes for the effect of that gloomy report to sink in. Our team had begun to play *The Other Side*, firmly committed to worldwide cooperation and mutual support. Now we were faced with global annihilation. Where had we gone wrong?

It's not often that such a question arises during a game, but it is commonplace during *The Other Side*. The objective here is to build a bridge across the chasm which separates the two sides of the world. But building the bridge costs money, which each side must earn from fuel refineries. Unfortunately, fuel resources are not equally distributed around the world, so each side has some fuel supplies that are needed by the other.

If countries cooperate and share resources, the bridge can be built with little or no conflict. Alternatively, the two sides can compete for resources by infiltration and attacks on each other's possessions. Communication between sides is limited to brief messages sent once a year via a hotline, so the potential is great for mutual misunderstanding. To make matters worse, each side has a defense system which is very sensitive to cues of aggression by the other side; at any time, the computer may take over and launch a defensive attack despite your team's best intentions.



Our kids especially enjoyed the great variety of events built into *The Other Side*, and the fact that each game is different. However, it took us a long time to figure out how to play. The documentation says very little about strategy and the effects of different options. For example, it explains that one option lets you attack patrols or drilling rigs that belong to the other side, but nowhere are you told why you should (or shouldn't) consider doing this. Also, *The Other Side* is difficult to play with fewer than six people, which is a drawback for home use. And it was frustrating to keep a handwritten record of possessions, resources, and so on; one would expect the computer to be able to keep track.

(Editor's note: The publisher points out that it's intentional that players are not told why they should or shouldn't choose any game option because of the philosophy that you learn by doing.)

Yet *The Other Side* can teach a great deal about conflict escalation and resolution, about communicating and the failure to understand, and about cooperation and competition. These concepts are so important in the world and so difficult to understand fully that perhaps *The Other Side* deserves extra consider-

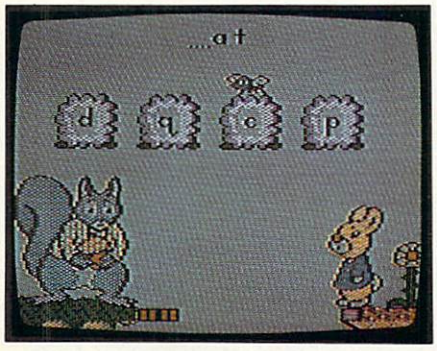
ation despite the extra time it takes to appreciate it. —TONY MORRIS

Peter Rabbit Reading
HARDWARE REQUIREMENTS: Apple, C 64/128.
PUBLISHER: Fisher-Price/Spinnaker Software
PRICE: $25-$40
PUBLISHER'S SUGGESTED AGES: 3-6

What a delightful game that both motivates and entertains young children to match letters and learn to recognize and spell simple words! Peter Rabbit, that popular fellow from the Beatrix Potter books, hops and jumps through the fields and woods, across rivers and over bridges, visiting his friends.

Each Potter character presents Peter with a reading test. At first, children match the first letter of a word/picture combination. Gradually increasing in difficulty, players match short words, then fill in missing letters. When the child answers correctly, pieces of a bridge appear.

In some sections, *Peter Rabbit Reading* uses the computer's sound system to provide audible clues. A word might appear as "-eg," for example, and the computer would say "leg." (The Commodore voice is excellent, while the Apple version is somewhat limited by the Apple's lesser sound capabilities.)

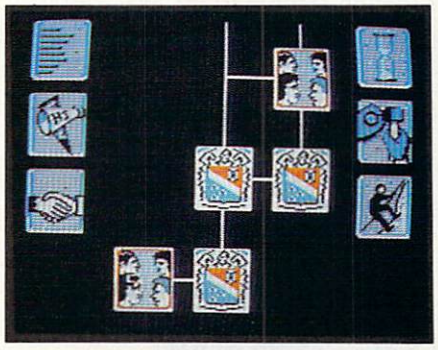


The excellent graphics are a real plus. My five-year-old daughter loved pressing the joystick button to make Peter jump as he walked. Kids who are familiar with the Potter books enjoy identifying the characters and locations, such as Jeremy Fisher's pond and Mr. McGregor's garden.

Peter Rabbit Reading is an exciting package. The use of spoken words and sounds significantly increases the educational value of language programs for young children, and I'd like to see more of that.
—MARLENE BUMGARNER ELTGROTH

ENTERTAINMENT

Alter Ego
HARDWARE REQUIREMENTS: Apple, C 64/128, IBM PC/PCjr, Macintosh.
PUBLISHER: Activision
PRICE: $50-$60
CRITIC'S SUGGESTED AGES: 12+



Here's a real first in computer entertainment—a fascinating, highly enjoyable game that's part role-playing adventure, part personality profile. You begin by answering a series of 25 true/false questions, such as "I am extremely sensitive to criticism" or "I will try to answer these questions honestly." This creates your electronic alter ego, a simulated person whose basic character is shaped by your answers.

Written by Peter Favaro, an author of puzzles for FAMILY COMPUTING, *Alter Ego* comes in two separate versions, one with a male character, the other female. Once you have been "born," you live through seven stages of life: infancy, childhood, adolescence, young adulthood, adulthood, middle adulthood, and old age. In each stage, you answer multiple-choice questions about how your character would react to specific life experiences. *Alter Ego* asks what you would do in everything from mundane activities such as school work, dating, or managing your money to crucial ones like deciding whom to marry, career choices, and when to buy a house.

Ethical, moral, sexual, and career questions lead to decisions about family and friends, college majors and authority figures. And each step of the way, your alter ego is monitored and graded on a wide range of personality traits, including calmness, confidence, expressiveness, gentleness, happiness, social skills, and trustworthiness.

Taken as a competitive game, there are ways to "win" by answering the questions in order to score

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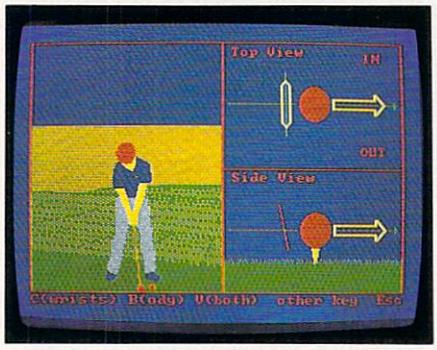
SOFTWARE REVIEWS

the highest grades. But *Alter Ego* is not intended that way. It's more of an experience than a challenge, which is why it makes an ideal party game, allowing a group to give its opinions on how the alter ego should act.

Be warned, though: there's one potentially serious drawback. Although combinations of questions will give different results, the game's questions are the same from game to game, limiting its long-time solo play. Perhaps additional disks with randomized experiences could be offered. In any case, while not a classic type of game, *Alter Ego* is one of the most provocative programs yet.

Championship Golf: The Great Courses of the World Volume One—Pebble Beach

HARDWARE REQUIREMENTS: IBM PC/PC*jr*.
PUBLISHER: Gamestar, a division of Activision
PRICE: $50
CRITIC'S SUGGESTED AGES: 10+



A giant step forward in gaming graphics combined with an exciting play system make this the best golf simulation my playtesters and I have ever seen. This should come as no surprise to computer sports enthusiasts, since Gamestar has been on the cutting edge of sports software for years.

But *Championship Golf* tops everything else they've done, largely because of the great graphics. Players are offered a selection of highly detailed 3-D, all-around views of each hole on the famous Pebble Beach course located in Monterey, California. You can walk around the course before, during, or after play to inspect the lay of the land and plan your strategy. Then, at any point on the course, choose from ground or bird's-eye view, magnified or normal, to help decide where and how to hit the next shot. It's as exciting a breakthrough as I can remember in gaming graphics.

The excellent play system requires timing and coordination to hit away; much practice on the driving range (where you can hit with every club in your bag) is suggested before you play. Expect to take a lot of time in getting your strokes down, but don't fret. This fine program is well worth the effort.

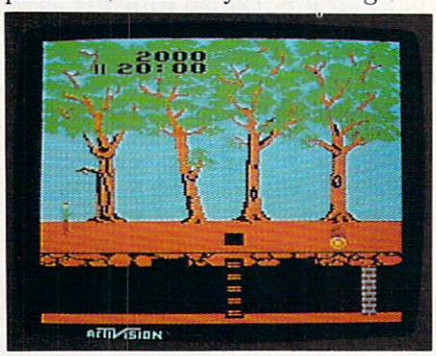
Garry Kitchen's GameMaker

HARDWARE REQUIREMENTS: 64K Apple, C 64/128.
PUBLISHER: Activision
PRICE: $40-$50
CRITIC'S SUGGESTED AGES: 12+

In the purest and rarest form of construction set, you must create practically every aspect of the game—from structure, form, and content to such elements as "plot," graphics, and rewards. These complex C-sets demand more time and effort in setting up than the simpler kind such as *Mail Order Monsters*, in which you build just a few aspects, not the whole game from scratch.

That's why I want to stress that *Garry Kitchen's GameMaker* is not for all computer gamers. It's a highly sophisticated program that demands from gamers as much as it gives. But with that understood, I must add that it is one of the best computer entertainment programs we have ever encountered.

In the guise of a comprehensive arcade game construction set, *GameMaker* is a major step forward in amateur designware. It is capable of providing hundreds of hours of diversion for would-be game-builders who want to dream up their own programs, then put them together step by step in a process similar to the one used by professionals. Menu-driven to a point, *GameMaker* obliges you to write instructions to the computer, draw characters and backgrounds with a pixel-by-pixel paintbox, animate your drawings,

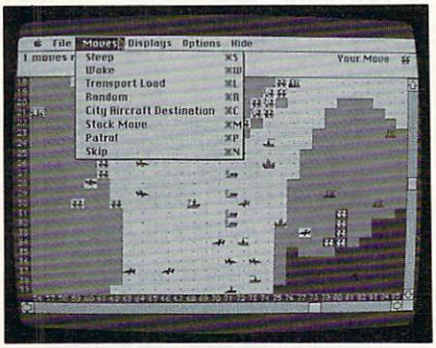


and create your own game situations.

GameMaker is a very time-consuming operation, but for those who want more than just a game, it's a real breakthrough in the entertainment market.

Strategic Conquest

HARDWARE REQUIREMENTS: Macintosh.
PUBLISHER: PBI Software
PRICE: $50
CRITIC'S SUGGESTED AGES: 12+



Strategic Conquest is a compelling, highly playable, and innovative strategy and tactics game for one player. It combines the exploration of an imaginary world with its conquest, using army, navy, and air units.

Employing an easy-to-follow, menu-driven play system, you choose from 15 levels of difficulty. Then, you appear at a random position on the map, starting off with only one military unit. By seizing independent cities and making them into factory centers, you slowly build up your forces—infantry units, air fighters and bombers, naval destroyers, aircraft carriers, transport ships, battleships, and submarines.

Each unit has a specialty; it is only through the use of combined arms—making your units work in concert toward defined goals—that you can beat the computer. The game features hidden movement, a patrol mode to keep your ever-expanding borders secure, voluntary combat, preemptive attacks, amphibious landings, and a host of other features which combine into a smooth, yet challenging simulation.

Playtesters were able to work in a group by assigning one player as air marshal, one as commodore, one as army commander, and the fourth as chief of staff. All strategic decisions were made by the group, and deadlocks settled by the chief of staff. Everybody rated *Strategic Conquest* highly, one of the year's best war games. —REVIEWS BY JAMES DELSON

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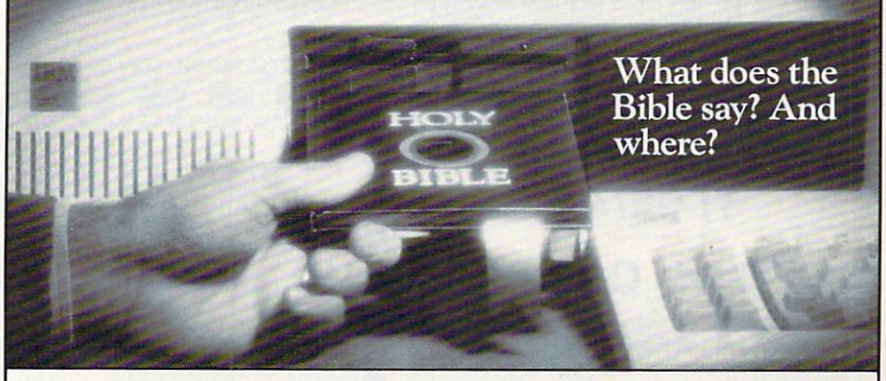

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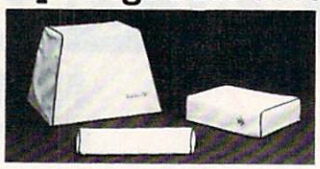

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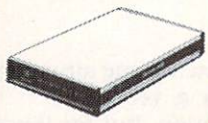

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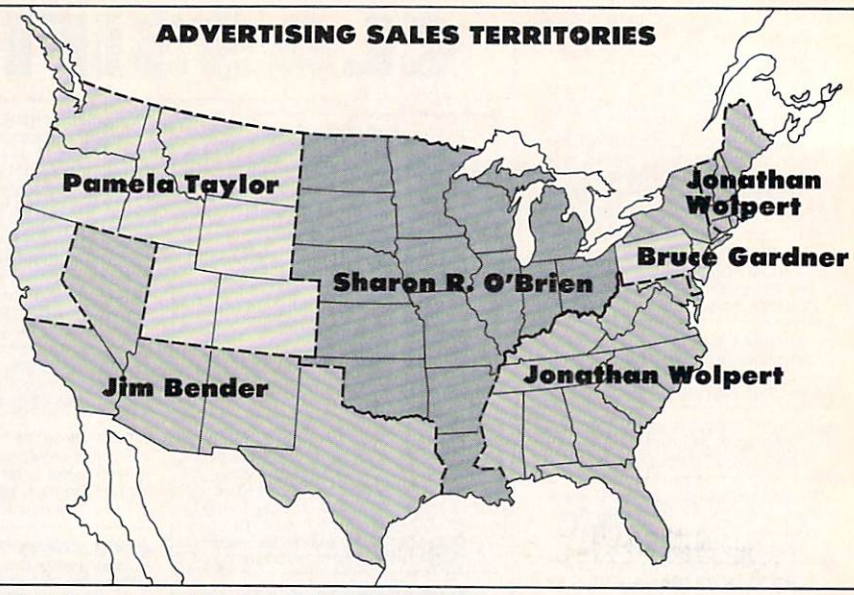

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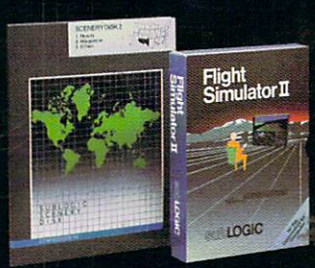

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